# 2018 Conference Schedule

**Poster Set-Up:**
Thursday, May 3 from 9:00 – 10:30 a.m., Harre Union Ballrooms

**Schedule of Events:**
Thursday, May 3, 2018, Harre Union Ballrooms A, B, and C

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<th>Time</th>
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<td>10:30 a.m. – 4:00 p.m., Ballrooms</td>
<td>Posters on Display</td>
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<tr>
<td>10:30 a.m. – 12:35 p.m., Alumni, Heritage, &amp; Brown &amp; Gold Rooms</td>
<td>Undergraduate Oral Presentation Evaluations</td>
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<td>12:00 p.m. – 1:30 p.m., Brown &amp; Gold Room</td>
<td>Lunch for All Participants</td>
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<td>1:30 p.m. – 3:30 p.m., Ballrooms</td>
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<td>1:30 p.m. – 4:30 p.m., Ballroom C</td>
<td>Open Reception</td>
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<td>3:30 p.m. – 4:30 p.m., Alumni &amp; Heritage Rooms</td>
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<td>4:00 p.m. – 5:00 p.m., Ballrooms</td>
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Dean’s Choice Awards 2018

**College of Arts and Sciences (5)**

*Addressing Citizen Concerns: Analysis of Heavy Metal Contamination in East Chicago, Indiana*
Zoe Henkes, Ashita Bhatnagar - Chemistry
Faculty Sponsor: Julie Peller; Christopher Iceman

*Mathematical Modeling of the Evolution of the Domestic Dog*
Ashley Hire, Samuel Iselin, Michael Revor - Mathematics
Faculty Sponsor: Alex Capaldi

*Nazi Germany's Effects on the Modern German Language*
Ariana Moore – Foreign Languages & Literatures
Faculty Sponsor: Katrin Fuchs

*Identification of Differences in Composite Vertical Profiles Between November Lake-Effect and System Snow Events in Northwest Indiana*
Evan Cade, Timothy DeRolf, Samantha Schletz - Meteorology
Faculty Sponsor: Kevin Goebbert

*Deconstructing the Gilded Age Mansion: Identity, Industry, and Culture through Architecture*
Anthony Kalin – History
Faculty Sponsor: Bob Elder

**College of Nursing (1)**
*A Qualitative Study: Undergraduate Students’ Attitudes and Beliefs About Marijuana*
Madissen Brookshire-Green, Bradley Adkins, Ellie Ashbrook, Andrea Pertl, Guadalupe Ortiz, Olivia Smith, Emma Kamp, Kayleigh Willett
Faculty Sponsor – Terry Kessler

**College of Engineering (1)**

*Solar Thermal Decoupled Process: The Rotating Disc Electrode's Effect on Mass Transfer of Cobalt Oxide*

Rachel Silcox & Guadalupe Villagran

Faculty Sponsors - Jon Schoer & Luke Vestrom

**Christ College (1)**

*Effective Sincerity: On Catholic Private Prayer and the Poetry of Mary Karr*

Emily Neuharth

Faculty Sponsor – Chelsea Wagenaar

**College of Business (1)**

*Student Branding*

Lauren Tehan, Matthew Pieroth, Sihao Zhou, Jessica Lawton

Faculty Sponsor – Musa Pinar
Diurnal Oviposition of Blow Flies in Different Aged Carrion

Kristi Bugajski, Raenah Bailey, Lauren Smith, Cecelia Frankewich, Monique Le Donne, Shelby Leucata, Janelle Bouman

Departmental Affiliation: Biology
College of Arts and Sciences

Project Code: BIO-1

Blow flies (Diptera: Calliphoridae) are among the first insects to oviposit (lay eggs) on carrion. The timing of blow fly oviposition is critical for determining a postmortem interval (PMI) estimation, which is the time that has passed between death and corpse discovery. The objective of this investigation is to gain more information about the timing of blow fly oviposition in relation to sunrise. Past research in our lab has shown that blow fly oviposition occurs an average of 4.75 hours after sunrise. This year’s research expanded on previous studies by placing six piglets of different ages, in a remote, wooded area one hour after sunrise. To see if there was a difference in the timing of oviposition related to the age of the carrion, three of the piglets had been thawed for 15 hours (new pigs), and the other three had been thawed for approximately 55 hours (old pigs). The piglets were checked once an hour until oviposition occurred, and it was recorded whether flies and eggs were present each hour. Egg masses were collected and reared to the third larval instar stage for identification using taxonomic keys. The timing of oviposition, in hours after sunrise, was compared between treatments and there was no significant difference found (P=.441). The research was repeated five times in the fall of 2017. The most common flies found ovipositing were Diptera: Calliphoridae, Phormia regina (Meigen) and Diptera: Calliphoridae, Lucilia coerulescens (Macquart). This research has importance in both the scientific and forensic communities, as a more accurate PMI can strengthen the validity of a forensic investigation.

Information about the Author(s):

Faculty Sponsor: Kristi Bugajski

Student Contact: Raenah Bailey kristi.bugajski@valpo.edu
Mapping NKCC1 in the endocytic pathway during PKC activation in Mardin Darby Canine Kidney Cells

Emily Hughes, Amanda Bazaldua, Chase Jones, Marie Dix, Natasa Petreska, Payton Klosa, Nicholas Barron, Patrice Bouyer

Departmental Affiliation:  Biology Department
College of Arts and Sciences

Project Code: BIO-2

Gut clearance represents an important defense mechanism of the gut by flushing out luminal bacteria and toxins. Transepithelial chloride fluid secretion is what drives gut clearance. The basolateral Na-K-2Cl cotransporter 1 (NKCC1) is the main mechanism for loading cells with chloride for its secretion by apical chloride channels (e.g., cystic fibrosis transmembrane regulator). We have previously shown that protein kinase C (PKC) activation causes internalization of NKCC1, thus blunting chloride secretion. However, the fate of NKCC1 remains unknown. To determine if NKCC1 is recycled or degraded, we used Mardin Darby Canine Kidney (MDCK) cells that stably expresses eGFP-NKCC1 to map the endocytic pathway. For immunocytochemistry, MDCK cells were cultured on coverslips in a six-well plate until confluence. Cells were exposed to either phorbol 12-myristate 13-acetate (PMA), an activator of PKC, or DMSO (vehicle). Cells were fixed with 1% paraformaldehyde, incubated with specific primary antibody against endosomal markers, and mounted for immunofluorescence. Images were acquired with an Olympus compound microscope equipped for fluorescence and processed using ImageJ. In these experiments, we did not find colocalization of NKCC1 with Rab5, a marker of the early endosome. We found occasional colocalization of NKCC1 and Rab11, a marker of vesicles recycling to the plasma membrane. Finally, we did not find colocalization of NKCC1 with either LAMP1 or P20S markers of the lysosome and the proteasome. Our results suggest that some NKCC1, after internalization recycles to the membrane in MDCK. Further investigation will be needed to determine the fate on NKCC1 in the endocytic pathway.

Information about the Author(s):
I graduated from Whitko High School as valedictorian in 2016. From 2016 to now, I have attended Valparaiso University where I am majoring in Biology and Chemistry. I plan to graduate from Valpo in May of 2019. I will then further my education by attending dental school. Upon completion, I plan to begin my career as a dentist.

Faculty Sponsor:  Patrice Bouyer

Student Contact:  Emily Hughes emily.hughes@valpo.edu
Identification of Blowfly Species Using PCR

Kayla Currier, Nathan McChesney

Departmental Affiliation: Biology
College of Arts and Sciences

Project Code: BIO-3

Forensic entomology is the use of insects in the criminal justice system. Blow flies (Diptera: Calliphoridae) are usually the first insects to arrive and oviposit (lay eggs) on carrion. Their early arrival makes the timing of blow fly oviposition critical for postmortem interval (PMI) calculations. To identify the exact species of blowfly from an egg mass or maggot, the specimen needs to be grown up through its life cycle for two weeks until it reaches its adult blowfly stage. Using egg masses that could be collected immediately, our goal was to shorten the identification process by analyzing the species differences in the cytochrome oxidase 1 (COX1) gene of the six most commonly found blowflies in the Northwest Indiana region. DNA was isolated from egg masses collected by the lab of Dr. Kristi Bugajski of Valparaiso University, and species were identified by sequencing of the DNA product. The goal of this investigation is to develop a protocol that could be done in a classroom setting, which would eliminate the need for sequencing as sequencing is expensive and not readily available on site. To accomplish this, six PCR primers have been developed that are specific to the six most common blowfly species in the area. After amplifying the isolated DNA with the six species specific PCR primers, agarose gel electrophoresis will be used to identify which species the DNA came from based on what primer amplified its DNA. If successful, the protocol will be published for use in a classroom setting.

Information about the Author(s):
Nathan McChesney is a senior at Valparaiso University studying Biology and Music Performance. After graduation, he intends to attend graduate school in order to obtain a Masters degree in molecular Biology. His aspirations are to one day be aiding research in human diseases.
Kayla Currier is a Senior biology major at Valparaiso University. After graduation she plans to attend medical school, and one day hopes to specialize in orthopedic medicine.

Faculty Sponsor: Dr. Beth Scaglione-Sewell

Student Contact: Nathan McChesney kayla.currier@valpo.edu
Addressing Citizen Concerns: Analysis of Heavy Metal Contamination in East Chicago, Indiana

Zoe Henkes, Ashita Bhatnagar

Departmental Affiliation: Department of Chemistry
College of Arts and Sciences

Project Code: CHEM-1

In East Chicago, Indiana, decades of industrial work led to heavy metals contamination to the surrounding environment. One residential area was built on an abandoned lead processing site, and lead soil levels measured well above the Environmental Protection Agency (EPA) limits in the 1990s. In 2009, the East Chicago site was added to the Federal Facilities National Priorities List (NPL), and the EPA designated it as a priority Superfund Site. While remediation measures have been underway by the EPA, the agency is not able to measure all possible places for metal contamination for all the residents. Therefore, we have investigated additional samples obtained from residents: dry soil, water, chipped paint and dust samples. Total acid digests have been performed on samples from 2016 and 2017 to determine the total metal concentrations. The samples have been analyzed using Inductively Coupled Plasma-Optical Emission Spectroscopy (ICP-OES). While we screened for 17 metals, analysis was focused on arsenic and lead. In each of the two years, two of the three vacuum bag samples indicated high levels of lead (>400 ppm), whereas all of the soil samples indicated high levels of arsenic (>0.68 ppm). Future work will focus on gastric and lung Physiologically Based Extraction Tests (PBETs) along with analysis for other organic chemicals and toxins in the environment.

Information about the Author(s):

Faculty Sponsor: Dr. Julie Peller and Dr. Christopher Iceman

Student Contact: Zoe Henkes zoe.henkes@valpo.edu
Institutional Outcomes following Total Pancreatectomy and Islet Autotransplantation in Children

Stephen Sekoulopoulos

Departmental Affiliation: Department of Chemistry
College of Arts and Sciences

Project Code: CHEM-2

ABSTRACT: Purpose: Total pancreatectomy with islet autotransplantation (TPIAT) is used to treat debilitating chronic pancreatitis (CP) and acute recurrent pancreatitis (ARP) that has failed medical and endoscopic therapy. There is limited knowledge about perioperative management and outcomes in pediatric patients. We describe our institutional experience with pediatric TPIAT.

Methods: A retrospective review of TPIAT patients at a free-standing children’s hospital was performed to determine preoperative pancreatitis course and perioperative outcomes of TPIAT.

Results: Twenty patients [median age 13, (range 4-19); 65% female] underwent TPIAT (2015-2017). Ninety-five percent had CP; one patient underwent TPIAT for ARP. Eighty-five percent had a pancreatitis-associated genetic mutation; 40% had pancreas divisum. Partial or full parenteral nutrition (PN) was used in 25% preoperatively.

Patients had a median of 4.5 hospitalizations (0-20) and 1 ERCP (0- 4) in the year preceding TPIAT. Preoperatively, 75% were taking opioids for pain control (60% daily). Three had preoperative diabetes; 11 had exocrine pancreatic insufficiency. All underwent TPIAT with Roux-en- Y duodenojejunosotomy and Roux- en-Y biliary reconstruction.

Median operative duration was 803 minutes (406- 1147). Median total islet equivalent count (IEQ) and dose (IEQ/kg) were 448,500 (228,000-927,000) and 6403 (1,904-14,242), respectively. Median length of stay was 27 days. Postoperative complications included percutaneous drainage of fluid collections (n=5), re-exploration for bleeding (n=1) and bowel obstruction (n=1). At 90 days postoperatively, all patients were off PN (p=0.01). There were significantly fewer patients on opioids at 90 days postoperatively, compared to preoperatively (42% vs. 75%, p=0.007). Reflecting beta cell function, median stimulated c-peptide was 1.95 (range 0.5-4.3) at 90 days, with a median insulin requirement of 0.47 units/kg/day (range 0-0.82).

Conclusion: Pediatric ARP/CP can be treated with TPIAT when debilitating disease persists in spite of maximal medical and endoscopic therapy. Opioid and PN use can successfully be weaned in the ninety days after surgery, while insulin weans require a longer period.

Information about the Author(s): Stephen is a senior chemistry and biology double major and member of Christ College at Valparaiso University. This past summer, he participated in a summer undergraduate research fellowship (SURF) at Cincinnati Children's Hospital in the Department of General and Thoracic Surgery. After graduation, he plans to pursue a masters in Integrative and Cellular Physiology before attending medical school, eventually pursuing a career in surgery.

Faculty Sponsor:

Student Contact: Stephen Sekoulopoulos stephen.sekoulopoulos@valpo.edu
Pterins are a class of nitrogen-heterocycle with wide application in the field of medicinal chemistry. The importance of pterin derivatives stems from discovery of numerous biologically relevant pterins, such as folate and bioterin. Due to this biological relevance, several pterin-based inhibitors have been developed for various biological targets. In this regard pterins can be viewed as a privileged scaffold, as the discovery of new pterin analogs gives rise to a vast array of potential drug candidates. 7-carboxymethyl-pterin (7-CMP) has previously been shown as a useful scaffold for the rapid generation of structurally diverse pterin amides. We are currently exploring multiple routes towards 7-CMP to assess the most efficient method of generating this useful scaffold. We intend to use 7-CMP as a building block in our search for selective inhibitors of fungal methionine synthase.

Information about the Author(s):
Dr. Jeff Pruet received his PhD in organic chemistry from the University of Texas, working on the synthesis of small molecule inhibitors of Ricin Toxin A. He has over ten years of experience in the exploration of heterocyclic chemistry, and the use of various heterocycles for therapeutic applications. He has been a faculty member at Valparaiso University since the fall of 2017.
Zach Bennett and Kassidy Grumbles are both undergraduates in the chemistry department at Valparaiso University.

Faculty Sponsor: Jeff Pruet

Student Contact: Jeff Pruet jeffrey.pruet@valpo.edu
Analyzing and quantifying microfiber pollution in the Lake Michigan watershed

Edward Kostelnik, Allen Huff, Julie Pohlman-Zordan

Departmental Affiliation: Chemistry
College of Arts and Sciences

Project Code: CHEM-4

Research in the field of microfiber collection and analysis has become quite important in understanding the types and quantity of pollution that inhabit watersheds around the world. Microfibers, which are a type of microplastic, are found in items such as our clothing, blankets, rugs, etc. Types of microfibers include, but are not limited to: polyester, rayon, acrylic, and nylon. As the use of these types of items becomes greater the amount of microfibers shed from these items into the environment also increases. In order to understand the microfiber pollution on a local level, research is being carried out on water samples in order to identify and analyze the microfibers found in the Valparaiso, Indiana waterway, known as Salt Creek. This creek eventually flows into Lake Michigan and carries water runoff from water treatment plants in Valparaiso and South Haven, Indiana. We have been collecting 500 mL water samples and collect total suspended solids (TSS) through filtration. The samples undergo the Fenton reaction to eliminate natural fibers from the filter quantify synthetic microfibers present in the creek. Standard samples are created in order to test the efficiency of the lab procedures. These standards include rayon, nylon, polyester, acrylic, and combined samples of clothing placed in beakers to shed microfibers. standards include rayon, nylon, polyester, acrylic, and combined samples of clothing placed in beakers to shed microfibers. The standard samples are processed alongside the water samples in order to quantify and analyze microfiber pollution in the local watershed. A significant number of the 500 mL water samples contain one or more microfibers, and polyester fibers appear to be the most common.

Keywords: Microfiber, microplastic, Fenton reaction, TSS filtration, pollution.

Information about the Author(s):
Edward Kostelnik is a freshman attending Valparaiso University and majoring in chemistry and biology, minoring in creative writing, and on the pre med track. His research interests include environmental chemistry and research over the human body. Edward’s future goal is to attend medical school and help others around him with research towards the human body and environment, and in practice. Allen Huff is a current freshman at Valparaiso University majoring in Chemistry and Secondary Education. Current research interests include environmental chemistry that incorporates aspects of biology. Future goals include pursuing a PhD in chemistry and attempting to solve the plastic problem. Julie Pohlman-Zordan is currently attending Valparaiso University and majoring in chemistry. Her research interests deal with environmental chemistry and overall figuring out how to help those around her. Julie's future goal is to solidify her decision on her major and possibly get involved in the pharmaceutical branch.

Faculty Sponsor: Julie Peller

Student Contact: Edward Kostelnik eddie.kostelnik@valpo.edu
Analysis of the Nuclear waste Extractants BTP and BTBP using LCMS

Thu Nguyen, Julie Peller

Departmental Affiliation: Chemistry
College of Arts and Sciences

Project Code: CHEM-5

BTP-tetra-sulfonic acid and BTBP-tetra-sulfonic acid are compounds used as extractants in the recovery process of actinides from discharged nuclear fuel. Actinides consist of fifteen metallic elements which range in atomic numbers from 89 to 103 in the periodic table. They are all heavy, radioactive and extremely unstable elements. Uranium and Plutonium are the two main actinides used as nuclear fuel. The purpose of the recovery is to separate the nuclides which contribute most to the long-term radiotoxicity of nuclear waste and to transform them into short lived or stable nuclides. Since these compounds are used to extract radioactive elements, it is important to understand the stability of these compounds to radioactivity. Therefore, they were subjected to different doses of gamma radiation. The concentrations of BTP-tetra-sulfonic acid, Na salt and BTBP-tetra-sulfonic acid, Na salt in standard solutions and samples containing different time of irradiation were successfully measured using the Liquid Chromatography-Mass Spectrometry (LCMS) method. Standard solutions (64 uM, 128uM, 142 uM) and irradiated samples were analyzed using selected ion recording (SIR) in the LCMS method. Peak areas of 862 g/mol (BTP-tetra-sulfonic acid) and 939 g/mol (BTBP-tetra-sulfonic acid) were collected and used to determine the concentrations of BTP-tetra-sulfonic acid and BTBP-tetra-sulfonic acid, Na salt. Similar to what is predicted by models, the increasing time of irradiation leads to a decrease in the concentrations of BTP-tetra-sulfonic acid and BTBP-tetra-sulfonic acid, Na salt.

Information about the Author(s):
The used nuclear fuel is highly radiotoxic and contributes the long-term radiotoxicity. Thus, the recycle of nuclear waste is important to the environment. BTP and BTBP are two compounds used as extractants to reprocess spent nuclear fuel. It is vital to understand and investigate the stability of these compounds to radioactivity.

Faculty Sponsor: Julie R Peller

Student Contact: Thu Nguyen thu.nguyen@valpo.edu
Enhancing General Chemistry Labs to Construct Engaging, Colorful Experiments

Emily Statza, Robert Clark, Laura Rowe, Julie Peller

Departmental Affiliation: Chemistry
College of Arts and Sciences

Project Code: CHEM-6

General Chemistry I (CHEM 121) sets the foundation for the chemistry education of Valparaiso students; therefore, it is critical that the CHEM 121 lecture and laboratory courses provide rich learning experiences that are meaningful, focused and both academically and visually engaging. In this project, two new or significantly revised laboratory experiments were incorporated into the curriculum during the Spring 2018 semester for the first time: 1) The Limiting Reagent in Action: Determining the Formula of a Precipitate and 2) The Analysis of Microplastic Pollution in Local Soil. The common goal of both labs were to increase student understanding of challenging general chemistry concepts by enhancing student engagement. In the case of Experiment 1, this was accomplished by improving the visual appeal of the reactions employed; in the case of Experiment 2, this was accomplished by directly connecting course material to study real-world pollution problems facing NW Indiana. Results of this experimentation and its impact on student learning in CHEM 121 are described.

Information about the Author(s):
Emily Statza is a senior chemistry major with human biology and psychology minors who hopes to go to a Physician Assistant graduate program after graduation in May. Emily has been working with Dr. Clark as a Peer Learning Assistant in General Chemistry for 3 years and expanded her work with General Chemistry this year via her research project.

Faculty Sponsor:  Dr. Bob Clark

Student Contact:  Emily Statza emily.statza@valpo.edu
Developing an Unnatural Amino Acid-Specific Aminoacyl tRNA Synthetase

Claire Mammoser, Laura Rowe

*Departmental Affiliation:* Chemistry  
*College of Arts and Sciences*

*Project Code:* CHEM-7

Unnatural Amino Acids (UAAs), amino acids not present in the human genetic code, have been synthesized to have a broad range of useful properties, in this case, as metal-binders which could have drug delivery applications. In order for the cell to place a UAA into the protein, two components, a unique aminoacyl tRNA synthetase and a corresponding tRNA must be present. If an amino acid is successfully charged to the tRNA, a stop codon is suppressed and a functional protein is built with the UAA at the mutation site. Such a tRNA molecule has previously been developed, as well as many synthetases specific to UAAs. In this work, the range of UAAs which can be incorporated into proteins using the *E. coli*’s own machinery is expanded by the development of a novel aminoacyl tRNA synthetase. By making a library of synthetase-coding plasmid variants and performing positive and negative screenings, the binding pocket of the synthetase can be modified for specificity to a UAA while not allowing the tRNA to be charged with a natural amino acid. In this work, we are attempting to evolve new tRNA synthetases for the incorporation of metal-binding amino acids by developing the plasmid library and a screening system to find synthetase variants meeting these criteria.

*Information about the Author(s):*  
Claire Mammoser is a chemistry major in her fourth year at Valparaiso University. After graduation, she plans to attend graduate school in analytical chemistry.

*Faculty Sponsor:* Laura Rowe

*Student Contact:* Claire Mammoser claire.mammoser@valpo.edu
Beta Radiation Sources for Attenuation Studies of Atmospheric Aerosols

James Rolland, Chris Iceman

*Departmental Affiliation:* Chemistry  
College of Arts and Sciences

*Project Code:* CHEM-8

We present the development of a new beta radiation source to detect total atmospheric aerosol loading of samples from a cascade impactor. Beer’s law principles are used to compare blank and sample substrates exposed to aerosol depositions to calculate total aerosol loading, including hydrocarbon aerosols which are invisible to other non-destructive techniques such as X-ray fluorescence.

*Information about the Author(s):*

*Faculty Sponsor:* Chris Iceman

*Student Contact:* James Rolland james.rolland@valpo.edu
**Phone Application for Multi-Site Church**

Ryan Kulwicki

*Departmental Affiliation:* Department of Computing and Information Sciences  
College of Arts and Sciences

*Project Code:* CS-2

The goal of this project is to implement and deploy a mobile application for a Network of Lutheran churches. The application is built on the XCode platform implemented using the Swift programming language. We have utilized the Facebook SDK allowing users to merge their Facebook accounts into the application. Other features include a library of available Sermon Podcasts, push notifications notifying of any news or updates, an integrated donation page, and a faith social groups page. One major feature that was requested by the customer was the inclusion of the Connect Card. The Connect Card is a tool the Churches use to gain information on new members who are just joining the church. The Connect Cards are integrated with their own internal database of Church members’ information.

*Information about the Author(s):*  
Ted Henderson is a senior computer science major who plans to continue his education in cyber security. Ryan Guerrero is a junior computer engineering major who intends to further his education in computer science. Ryan Kulwicki is a junior computer science and mathematics major who plans to work as a software engineer. Kaleb Mertz is a senior computer engineering. Adithya Sahasranamam is a senior computer science major.

*Faculty Sponsor:* Nick Rosasco

*Student Contact:* Ryan Kulwicki ryan.kulwicki@valpo.edu
Student Governance Digital Business Process

Shayne Barron, Zachary Diamond, Nate Weber, Alex Watson

Departmental Affiliation: Computing and Information Sciences
College of Arts and Sciences

Project Code: CS-3

To support evolving expectations for digital business processes and paperwork handling, this project is focused on the creation of a suite of web applications that allow the replacement of a number of paper forms with a more sophisticated system. As an exercise in customer and client management, in collaboration with Craig Behnke (a sophomore senator of the Valparaiso University Student Senate), various customer needs and operational requirements were identified - tiers of privileges and access (someone in UPC shouldn't have access to view the forms of another organization), some forms require approval from Student Senate, while others need to be voted upon. These forms include but are not limited to line item shifts, encumbrance requests, stipend encumbrance requests, and capital expenditure requests. To support digital editions of these forms, a mix of technologies were used. These included HTML and CSS for the front end implementation, and SQL and PHPmyAdmin as back end components. The expected result is a prototype that the Valparaiso University Student Senate can use as the basis for digital record keeping, with a long term aim of decreased reliance on paper, simplified access to student organization information, data security, and less mechanical effort for student governance operations.

Information about the Author(s):

Faculty Sponsor: Nicholas Rosasco

Student Contact: Shayne Barron shayne.barron@valpo.edu
Interface Extensions to the AMC Evaluation Platform

Casey Primozic, Jackson Roush, Robert Schenck, Benjamin Levandowski, Brian Doriott, William Sullivan

Departmental Affiliation: Computing and Information Sciences
College of Arts and Sciences

Project Code: CS-4

For nearly a decade, the Auto Multiple Choice (AMC) application has allowed educators to provide high-quality assessments for their courses. While this tool provides easy quiz generation and grading, the barrier for entry is high because of the underlying platform requirements. By removing the necessity of familiarity with Linux and LaTeX, this project can expand the usability of AMC by extending the existing functionality with a user-friendly graphic web interface. Faculty without the specialized skill set would then be able to use the software. This project accomplishes the aforementioned goals by extracting existing scripts in the program and utilizing them in a JavaScript-based (with ReactJS) web front end. This front end reduces the process of question and quiz generation to a set of malleable HTML forms. The output of these forms is then taken by a Python-based backend, which takes question sets, generates LaTeX from HTML form input, and calls existing AMC scripts to generate PDF quizzes.

Information about the Author(s):

Faculty Sponsor: Nicholas S. Rosasco

Student Contact: Benjamin Levandowski casey.primozic@valpo.edu
The Modernization of the VU Lutheran High School Directory

Tyler Ammons, Thomas Schuessler, Franklin Kirui, David Schmeling

Departmental Affiliation: Computing and Information Sciences
College of Arts and Sciences

Project Code: CS-5

To support the Office of Church Relations at Valparaiso University, this project modernizes and extends the existing digital tool suite used to generate the multiple formats of the Lutheran High School Directory. This successor solution provides greater security through modernized code, operational documentation, and overall long-term maintainability. These enhancements come through the provision of a redesigned centralized database, unified front end, and greater reuse including the Google API. This reimplementation decreases the overhead for providing the directory to the global Lutheran community.

Information about the Author(s):
Tyler Ammons is an undergraduate computer science student from McHenry, Illinois.
Franklin Kirui is an undergraduate computer science student from Greensboro, North Carolina.
David Schmeling is an undergraduate computer science student from Hartland, Wisconsin.
Alex Schuessler is an undergraduate computer science student from Milwaukee, Wisconsin.

Faculty Sponsor: Nicholas Rosasco

Student Contact: Tyler Ammons tyler.ammons@valpo.edu
Web Application for Student Analytics

Cristian Abello, Ryan Bennett, Samuel Iselin, Arezu Mansuri, Kimberly Orr

Departmental Affiliation: Computer and Information Sciences
College of Arts and Sciences

Project Code: CS-6

Schools collect a considerable amount of important data about their students, but using that data effectively can be difficult. In support of Joseph Haines, Adjunct Instructor of Mathematics and Statistics, this group of 5 students has developed a web tool that allows schools to search for patterns in their student data, especially patterns related to test scores and other quantitative data. This tool was developed in an Agile environment using a combination of Python, its Flask and Bokeh libraries, and HTML/CSS, which creates an interactive web tool that can support multiple concurrent users, as well as enhanced maintainability through centralized support capabilities. After a user uploads their data, the tool has three key functions, including pivot table views, data visualization, and multiple regressions. This project will allow teachers and school administrators to gain insight into how students are performing, and allow them to identify problems and teach students more effectively.

Information about the Author(s): Cristian Abello is a graduating senior with a major in computer science and double minors in mathematics and business administration. Ryan Bennett is a senior majoring in geography and history with minors in computer science and Japanese. Samuel Iselin is a junior majoring in mathematics and computer science and minoring in biology. Arezu Mansuri is a junior majoring in computer science and minoring in mathematics. Kimberly Orr is a junior majoring in computer science and statistics and minoring in mathematics.

Faculty Sponsor: Nicholas Rosasco

Student Contact: Kimberly Orr cristian.abello@valpo.edu
Harnessing the Power of Stories

Willow Walsh

Departmental Affiliation: English
College of Arts and Sciences

Project Code: ENGL-1

What matters to you? When have you felt a sense of belonging? Not belonging? The Welcome Project wants to know. With a 300+ story collection, the Project gathers a variety of individual perspectives, covering a range of topics from race, sexual orientation, socioeconomic status, immigration, and many more. The Welcome Project provides participants a space to dig into our stories' themes and think about how they can apply to their own contexts. Participants frequently walk away feeling excited and motivated by the experience. Thus, I wondered: how can people take the Welcome Project with them to their own institutions? The toolkit I created aims to be a comprehensive, step-by-step guide for those wanting to start their own Welcome Project. It is intended not only to respond to the need of energized participants but also to the Project's need to quickly and effectively respond to an increasing number of requests from individuals and institutions looking to replicate the project. Introducing the Project to another institution can be laborious and costly, so the creation of the kit is of use on both fronts. The toolkit, itself, includes the breadth of the work done on the Project such as: how to interview, edit stories, and then facilitate conversations with those stories using the Center for Civic Reflection's practice. The toolkit aims to give other institutions the capability to learn the Welcome Project's basic practices, which, once harnessed, give participants the rare opportunity to come together across difference to discuss issues that permeate their campuses and communities.

Information about the Author(s):
Willow Walsh is a junior English major from Valparaiso, IN. She is minoring in Environmental Studies, German, and Creative Writing. Currently, she interns for the Welcome Project and serves on the President's Commission for an Inclusive Valpo Community (CIVC) as well as Valparaiso City's Human Relations Council.

Faculty Sponsor: Liz Wuerffel

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The Modern Heroine is Masculine: Male and Female Heroism during World War I in France [L’héroïne moderne est masculine: l’héroïsme des hommes et femmes dans la première guerre mondiale en France]

Jewan Attallah

Departmental Affiliation: Foreign Languages and Literature
College of Arts and Sciences

Project Code: FORL-1

As part of a larger research project addressing women and female gender identities during World War I, this research analyzes the fashion of French flappers shown in photos in twentieth century French magazines, and women's roles and actions that replaced men who fought in the war. This research raises the question: Can women be heroes in twentieth century France like men? Where it comes to questions of heroism during WWI, the literature tends to focus on the men who fought in the war for their country, in the name of French nationalism. A comparative analysis of gender roles between men and women reveals more about what it meant to be a modern woman during times of war. At the time, to be a French hero in WWI meant to fight as a soldier for the country France. Since women were not allowed to enlist in the war, their roles changed in relation to their transitioning society. They had to replace the men in the workforce; they were expected to support the injured soldiers as nurses and caregivers. Women's actions were still done for the well-being of France. French women used fashion and acts such as cutting their hair to physically represent the new, modern women. Thus, I argue that the modern female heroine becomes masculine in twentieth century France by her actions and by her physical fashion choices because she is independent, patriotic, and fighting for French nationalism.

Information about the Author(s):
Jewan Attallah is a senior triple major in History, French, and International Economics and Cultural Affairs from Valparaiso, Indiana. This project belonged to the French senior seminar topic of Heroes. After her semester abroad in France, her interests in French literature and French culture heightened. With her prior studies in European women's history, she was inspired from the French fashion industry and Simone de Beauvoir feminist movement to study how gender roles change in relation to war. She looks forward to continue her French language studies by reading French literature in her free time.

Faculty Sponsor: Karen Berrier

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Learning Dialects: Potential Aide in the Integration of Refugees in Germany

Will Levi

Departmental Affiliation: German
College of Arts and Sciences

Project Code: FORL-2

This paper investigates the possibility of including dialects in German language courses as a method to establish a working knowledge of the German language, specifically aimed towards the integration process of refugees. Since the refugees' needs are certainly different from those of traditional students, it is important to redesign the course structure to better fit their necessities. This is particularly the case because refugees are often sent to areas where dialects are frequently used (i.e. Bavaria and Swabia in Southern Germany), yet they are given no training in understanding these language variations. Simply put, the standard language typically taught in traditional German courses is not representative of everyday speech in these regions. For this reason, it would be practical to raise awareness of linguistic variants. With specific regard to the Refugee Crisis, the main point of this paper is to call for a vocational approach in foreign language teaching to better align the content of courses with the needs of the participants.

Based on a study by Thomas Studer (2002), my personal experiences, and accounts from refugees, this paper discusses the potential value and methodology for increasing dialect competence in a classroom setting. Connecting this to the recurring circumstances for refugees, the question is posed how knowledge of local dialects would assist them in attaining their desired professional and academic goals. This reimagining of the purpose of integration courses postulates an applicable education with a renewed focus on the refugees and their specific objectives.

Information about the Author(s):
Will Levi is an International Business / German double major with an interest in fostering dialog across different cultures, as a continuation of his work in the Reutlingen University International Office. The project is an exploration of his own difficulties in entering the German workforce as a speaker of the standard language, rather than local dialect. Will's future goal is to utilize his experiences to better facilitate the integration process for others.

Faculty Sponsor: Professor Katrin Fuchs

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Greek Drama and Disease: Ancient Parallels to Modern Perspectives

Max Shiller

Departmental Affiliation: Foreign Languages--Classics
College of Arts and Sciences

Project Code: FORL-3

If there is one consistent aspect across cultures and time, it would be the human race's struggle with disease, mental or physical. Diseases of course are perceived differently given a people group's scientific and religious backgrounds but parallels are able to be drawn. Utilizing Greek drama, contemporary of some of the first historically prominent doctors, we can examine our own perceptions through this medium. In exploring this topic, social perceptions of disease will be examined using certain Greek dramas as well as other historical documents in order to trace similar ideas present in today's society. I hypothesize that there will be very different perceptions of physical ailments but that stigmas about mental health have remained relatively constant. Regarding specific primary sources that will be utilized, the Greek dramas will be Sophocles' Philoctetes and Euripides' Medea while the historical document that will be focused upon is Thucydides' Histories.

Information about the Author(s):
Max Shiller is a sophomore undergraduate student majoring in History, Classics, and Humanities. His selection of the project stemmed from an interest in natural disaster history after attending an American Institute of Archaeology Lecture on Pompeii last spring. Shiller intends to pursue further research in ancient natural disasters and Mediterranean cultures as well as a doctorate in Classics.

Faculty Sponsor: Allannah Karas

Student Contact: Max Shiller max.shiller@valpo.edu
The way languages change is an interesting concept. Languages are strongly affected by the passage of time, which is present in the difference between how different generations speak, time is not the only thing that changes languages. Culture is also a significant factor. As politics shift and new discoveries like the printing press are made, the connotation of words and even their meanings shift as well. This essay focuses specifically on the German language during the Nazi era and how language was used by the Nazis in propaganda to control the population. An example of this idea is the German word for ‘camp’, which is Lager. Before World War II, Lager simply referred to a camp with tents and a campfire, but during World War II and the rise of concentration, work, and death camps in Germany, Lager came to have a negative connotation associated with it. This is only one example of how the Nazis used carefully-chosen language in propaganda to seize and maintain power throughout the Nazi era. Through the analysis of specific words that the Nazis used and of the people’s reaction to the words then and now, I will determine exactly how the German language changed before and during World War II. I will come to the conclusion that Nazi-German and the language used in propaganda changed the German language because the use of certain words in propaganda changed the connotation and context of those words, and those changes still exist today.

Information about the Author(s):
My name is Ariana Moore, and I am currently a senior at Valparaiso University. My interest in Germany during the Nazi era stems from an interest in German history in general, and I found it particularly intriguing that one small part of history could change the way people use language could affect the connotation of words seventy years later. After college, I hope to be in Germany again as an English teaching assistant through Fulbright.
Ancient Feminism: Troy and the Cold War Germany

Olivia Curcio

Departmental Affiliation: Classics
College of Arts and Sciences

Project Code: FORL-5

In her novel, titled Cassandra, Christa Wolf writes about the society of Cold War Germany in a way that does not directly speak out against her government, using a foreign world to demonstrate her ideas. Cassandra was a princess of Troy who was given the gift of prophecy at a young age, but was cursed so her visions would not be believed. Christa Wolf, a prominent political author from East Germany, became fascinated with the character of Cassandra while on a trip to Greece with her husband, Gerhard. Wolf saw parallels between her life during the Cold War and what she imagines life would have been like for citizens of Troy during the war. In this paper, I show how Wolf depicts the home country of Cassandra as a patriarchal society and, in this way comments on the male dominated government in Germany throughout the Cold War. In Cassandra, Wolf expresses her ideas through examples, showing her readers the cause and effect relationship that she sees between the suppression of women and the violence of war. Coexisting cultures are juxtaposed in the novel to show the differences between them. By going deeper into the daily life of Trojan people and the Trojan women who are often ignored, Wolf demonstrates both her arguments against her current government and the faults of a society where only men make the important decisions.

Information about the Author(s):
My name is Olivia Curcio. I am a Sophomore Exploratory Major, but I am strongly considering declaring a major in the Classics. One of my favorite things about studying the classics is looking at how ancient people thought about topics we still see today and how those perceptions have evolved. The idea that the same problems humans faced centuries ago can still be applied today is fascinating to me. I wrote this paper as part of a Christ College seminar class on the Trojan War, and I was very interested to see how political author Christa Wolf connected the Trojan War to the Cold War.

Faculty Sponsor: Professor Allannah Karas

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Antiquity and Applicability: Medea's Connection to Modern Social Issues

Taylor Nesselroad

Departmental Affiliation: Classics Department
College of Arts and Sciences

Project Code: FORL-6

Too often Greek drama is regarded as significant only for artwork or entertainment, and its ability to shed light on or relate to modern day society is overlooked. Almost 2500 years later, society is still grappling with the very same social issues that reside at the center of the Medea, Euripides’ Greek tragedy. Medea herself is one of the most controversial fictional subjects to appear in a tragedy. On the spectrum from empowered woman ahead of her time to ruthless and irrational murderess, as the general population’s opinion on women has morphed throughout the years, so too has the image of Medea. When her husband and sponsor, Jason, leaves her for another woman she is faced with the reality of being dishonored, neglected, and exiled. She resorts to violence, escapes, and is in no way punished for her crimes, which involve the murder for four people, two of which were her own children. In this paper, I explain why she is considered one of the most shocking characters to ever be portrayed on stage and how her social status played a role in her limited options resulting in tragic decisions. Medea demonstrates how society’s opinion influences social status. This connection can be utilized to better understand the issues faced by immigrants or refugees seeking asylum. The character of Medea at her core provides insight into the frustrated mind of women in complex situations that are trapped by society’s expectations such as immigrants or war refugees.

Information about the Author(s):
Ever since a junior high mythology class, Taylor Nesselroad has been fascinated with ancient language, literature, and civilization. She continues this passion and is currently a freshman at Valparaiso University pursuing a Classical History degree and in Christ College. She is minoring in Chemistry and on the Pre-Medicine career track. After her graduation in 2021, she plans on attend medical school to become a dermatologist or plastic surgeon.

Faculty Sponsor: Allannah Karas

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A Case Study of Four Atmospheric River Events Over the Pacific West Coast of the United States

Isaac Arseneau, Wendell Nuss

Departmental Affiliation: Meteorology
College of Arts and Sciences

Project Code: GEO/MET-1

Atmospheric Rivers (AR) are moisture phenomena related to cyclones which bring moisture and large amounts of precipitation to areas of enhanced elevation along coastal areas. These events bring much of the rain received by the state of California, and the past winter was no exception, as many AR events brought much-needed rain to the region. Four different events from the 2016 fall through 2017 spring seasons are examined to better identify the relative roles of long-range moisture transport versus local moisture fluxes in AR events. Cross-sections of areas and times of interest during each event are generated, along with trajectory analyses which will aid in determining the origin of the moisture being moved. Both the cross-sections and trajectory analyses are taken from the CFSR (Climate Forecast System Reanalysis) model. It is expected that the results of these processes will support the findings of Dacre et al. (2015), which show that the moisture anomaly present during AR events is not actually due to moisture transport directly along the AR. Rather, the AR is the result of moisture convergence from a combination of the warm conveyor belt forcing the ascent of moisture over the warm front and the trailing cold front forcing ascent as it moves eastward. The importance of this research is evident on the US West Coast, as water conservation in this naturally dry region is extremely important to the ever-expanding cities and communities present there and requires long-term planning, which is aided by our increased understanding of AR events.

Information about the Author(s):
Isaac Arseneau is a third year student at Valparaiso University, and is studying Meteorology along with math and computer science.
Dr. Wendell Nuss is a professor and chair of the Department of Meteorology at the Naval Postgraduate School in Monterey, California. He served as the adviser to this project.

Faculty Sponsor:

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**Monitoring Vernal Pools in the Indiana Dunes**

Sidney Noble

*Departmental Affiliation:* Geography/Environmental Science  
*College of Arts and Sciences*

*Project Code:* GEO/ENVS-1

In the early spring throughout the temperate woodlands of North America, there is a unique aquatic ecosystem that develops, vernal pools. Vernal pools are unique in that they fill with water in the winter and spring, evaporating in the summer months. These pools provide habitat for hundreds of organisms that face predation from fish in permanent water bodies. Additionally, one of these organisms, fairy shrimp, depend on these ephemeral pools for their lifecycle. However, under the threat of climate change these vernal pools face numerous vulnerabilities, ranging from higher evapo-transpiration rates to more extreme precipitation variability. Thus, it is crucial to monitor these pools and understand what factors can make them more resilient to climate change. For this study, in collaboration with the Indiana Dunes National Lakeshore, vernal pools were verified throughout the Cowles Bog unit. The locations of these vernal pools were entered into a spatial database. Additionally, water chemistry tests, macroinvertebrate surveys, and photographs were collected. This data will provide a baseline for future monitoring by the National Park Service.

*Information about the Author(s):*  
Sidney Noble is an avid long distance runner, enjoys backpacking, and identifying plants. He will be attending Miami University of Ohio in the fall for his Master's in Botany with Ecology.

*Faculty Sponsor:* Laurie Eberhardt

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Monitoring Black Oak Savannas in the Indiana Dunes

Sidney Noble

Departmental Affiliation: Geography/Environmental Science
College of Arts and Sciences

Project Code: GEO/ENVS-2

The Indiana Dunes National Lakeshore in Northwest Indiana contains one of the rarest ecosystems, the black oak (Quercus velutina) savanna. An oak-savanna is a wooded community with herbaceous groundcover and a tree canopy between 10 and 50%, consisting mostly of Quercus sps. The total number of oak-savannas in the Midwest has decreased by 99.8% in the past century, from 15,000,000 acres to 30,000. Today, the black oak savannas in the Indiana Dunes are under threat due to fire suppression and a decreased fire interval. This fire suppression has allowed some areas to transition to a closed canopy woodland, allowing shade tolerant and fire intolerant species to take root. The purpose of this study was to compare three different sites within the Indiana Dunes (Cowles Bog, Miller Woods, and Dune Ridge) and document change from a 1990 study conducted by the National Park Service. Forest composition, canopy cover, and tree density were measured at three sites within the park that were historically black oak savannas. Cowles Bog and Dune Ridge had a stand density of 800 trees/ha and 538 trees/ha, with canopy covers of 72.28% and 68.55%, respectively. Only Miller Woods can still be considered a black oak savanna with a stand density of 275 tree/ha and a canopy cover of 41.77%. This is most likely due to high prescribed fire frequency and intense restoration efforts since 1980.

Information about the Author(s):
Sidney Noble is an avid long distance runner, enjoys backpacking, and identifying plants. He will be attending Miami University of Ohio in the fall for his Master's in Botany with Ecology.

Faculty Sponsor: Bharath Ganesh Babu

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Medieval Japanese Culture and Catastrophe: Evaluating Societal Responses to Natural Disasters.

Max Shiller

Departmental Affiliation: History
College of Arts and Sciences

Project Code: HIST-1

Japan's unique geographical location on the seismically active "Ring of Fire" has and will continue to produce catastrophic earthquakes and tsunamis. The Japanese experiences of coping with natural disasters throughout history have contributed to the development of their unique cultural identity. Unlike other Asiatic cultures, the Japanese have vivid imaginations of apocalyptic scenarios despite lacking a Judeo-Christian tradition and have tied natural disasters to both the final End of Times as well as the end of different eras. To exemplify this idea, I will examine the five-year Genpei War period (1180 to 1185 AD), which featured both natural catastrophes as well as political upheavals. Considering the sparse historical documentation of the events of the Genpei War, I resort to two pieces of literature in researching this topic. The first is *The Tale of the Heike*, a Japanese epic that accounts events of the Genpei War. The second is *The Account of a Ten-Foot Square Hut*, a collection of poetry by Kamo no Chomei, a contemporary of the Genpei War. These two narratives demonstrate that to the Japanese during the 12th century, events of the natural world reflected and corresponded with political trends. More specifically, natural disasters occurred to punish the government's religious immorality.

Information about the Author(s):
Max Shiller is a sophomore undergraduate majoring in History, Classics, and Humanities. His selection of the project stemmed from an interest in natural disaster history after attending an American Institute of Archaeology Lecture on Pompeii last spring. Shiller intends to pursue further research in ancient natural disasters and Mediterranean cultures as well as a doctorate in Classics.

Faculty Sponsor: Yun Xia

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Setting the Stage: 40 Years in VU Theatre

Leilah Hovey

Departmental Affiliation: History/Internship with the Archives and Special Collections
College of Arts and Sciences

Project Code: HIST-2

Using photographs housed in the University Archives and Special Collections and the digitized collection of
<em>The Torch</em> and <em>The Beacon</em>, I identified the names, dates, and venues of each production. In my presentation I focus on three specific venues (i.e., the University Chapel Auditorium, Kroencke Hall, and the Memorial Opera House) and explore how the way in which these venues were utilized changed as theatre at the University developed from the 1940s to the 1980s.

Information about the Author(s):
Leilah Hovey is a junior Creative Writing and History double major. She works in the University's Archive and Special Collections after having completed an internship there in the Fall of 2017. Having performed in theatre productions throughout high school Leilah was drawn towards picking a topic with something she had a passion for. Leilah hopes to attend grad school for a degree in Information Sciences so she can continue working in Archives throughout the world.

Faculty Sponsor: Kevin Ostoyich

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Arab Nationalism in a Francophone Country: The French Language and Moroccan Identity

Jewan Attallah

Departmental Affiliation: History
College of Arts and Sciences

Project Code: HIST-3

This paper examines French colonization in Morocco (1912-1956) and the formation of Moroccan national identity. After gaining independence in 1956, the Moroccan government implemented a language policy that aimed to reconstruct Arab-Moroccan national identity by only allowing standard Arabic in public education. As a legacy of the French protectorate, French became the language of aristocrats and upper classes. Currently, the linguistic split between Arabic and French makes students unemployable and illiterate because schools are not adequately preparing them for Morocco's workforce. French language fluency is required in political, economic, and academic sectors. While most scholars focus on contemporary debates, my paper revisits French imperialism to understand the relationship between the debate over language and questions of national identity. I argue that French colonization shaped Moroccan identity through language. In particular, I examine how the French protectorate treaty transformed Morocco's national identity by introducing French language to Morocco's educational system. In the end, this research better explains the Francophone origins of Morocco and the effects of historical western colonization on an Arabian-Muslim country.

Information about the Author(s):
Jewan Attallah is a senior triple major in History, French, and International Economics and Cultural Affairs from Valparaiso, Indiana. This research belonged to the History Senior Seminar topic empires and imperialism. During her semester abroad in France, a simple conversation with a Moroccan university student about the French and Arabic languages in North Africa inspired Jewan to study the role of the French language in Arab countries and the history of French colonies in Northern Africa for her senior history thesis. She began learning the French language as a way to better understand her Middle Eastern cultural origins. This research project helped her see the effects of Western influences on Arabian countries and culture.

Faculty Sponsor: Luis Ramos

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A Lantern Slide Through Time

Journey Joll

Departmental Affiliation: History
College of Arts and Sciences

Project Code: HIST-4

Using lantern slides and various campus publications housed in the Valparaiso University Archives I explore campus life from 1925 to 1933. The standards for men and women at Valparaiso University differed drastically from what they are today. Particularly, there were rules that governed interactions between male and female students. I examine the rules and norms on campus at the time to highlight a contrast with modern campus life and to attempt to explain why the romance between a student, Lorena LaHayne, and an instructor, Myers Zimmerman, was not seen as scandalous at the time.

By investigating the specific case of the student LaHayne and her instructor, I argue that the strict rules for student interaction may have actually helped to encourage such a romantic relationship.

Keywords: Zimmerman, LaHayne, gender, campus life, rules, lantern slides

Information about the Author(s):
I am a sophomore history major with an interest in tracking moral and ideological developments over time. During a history internship in the University archives, I was drawn to working with the lantern slides for their unique images. As I researched the context for the slides in student handbooks and university publications, I came to find the expectations for students then was very different than in modern time, prompting further review and ultimately this project.

Faculty Sponsor: Professor Kevin Ostoyich

Student Contact: Journey Joll joy.joll@valpo.edu
The Start of the Week

Justin Holland

Departmental Affiliation: History
College of Arts and Sciences

Project Code: HIST-5

The Week of Challenge was a student-led event that invited dozens of prominent speakers to a conference-styled discussion of broad topics. The students hoped to be inclusive of all thought and fields of study. The first wave of Week of Challenge occurred in the mid-1960s and lasted to about 1972. I focus my research on the reasons why the Week of Challenge stopped after over half a decade of success. I explore many hypotheses regarding why the event was discontinued: dissent from women on campus; organizational failures; pushback from STEM fields. Ultimately, I argue that the Week of Challenge was deeply connected to the activism of the 1960s, and once policy goals were being accomplished, students started to lose interest in social issues during the 1970s.

Information about the Author(s):
I am a political science and history major. When given the list of projects I knew I wanted to examine a time when students were actively involved in their educational experience. Looking for a project that would satisfy my interest the archivist and myself decided upon a collection of reel-to-reel tapes. The tapes had speeches made by many prominent speakers all addressing questions of great thought, which piqued my interest.

Faculty Sponsor: Kevin Ostoyich

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Microhistory studies history in an enclosed space, interpreting the trends, themes, and forces of an era through a small context such as a single city or village, it tells the story of the whole through the parts. In this study of Gilded Age history, the methods of microhistory are taken a step further to focus on a single building. Using the John H. Barker Mansion in Michigan City, Indiana as a case study, I utilize the design, construction, and decoration of a single building to highlight larger historical forces at play. The architect’s vision, the Barker family’s history, and the economic context of the mansion provide insight into the roles of culture and symbol in a nineteenth-century industrial town. These small parts of the whole both redefine and reflect the Gilded Age; understanding the interplay between the whole and its parts is essential in understanding the time period itself. The building blueprints and family correspondence with the architect, along with myriad sources on Michigan City’s immigrant communities, labor politics, and factories provide a narrative of culture and identity that is lacking in the broader, typically urban narrative of the Gilded Age. The Gilded Age has a strong import into the present, today’s notions labor, home, faith, and community have their root in this time period. Making the cultural dynamics of the Gilded Age tangible, via the four walls of the Barker Mansion, is key to recognizing and understanding this historical import.

Information about the Author(s):
Anthony (TJ) Kalin is a junior history and philosophy major from Valparaiso Indiana. TJ has an interest in nineteenth-century cultural history as well as Polish-American immigration history. He is currently working on a monograph, <em>Gilded in Duneland: Michigan City 1860-1920</em> that will be available through the History Press of Charleston SC in May 2019, as well as a history honors thesis on the cultural meaning of suicide in Gilded Age Chicago.

Faculty Sponsor:  Robert Elder, Ph.D

Student Contact:  Anthony Kalin anthony.kalin@valpo.edu
Delayed-onset muscle soreness (DOMS) is the pain or discomfort that occurs 24-72 hours after exercise, and usually appears within two or three days. Treatments such as pulsed ultrasound and self-myofascial release have been proposed to reduce and treat the symptoms of DOMS. The purpose of this study was to look at the effects that both pulsed ultrasound and self-myofascial release via foam rolling have on DOMS, and to see if one method is more effective than the other. Fourteen female Division I athletes (Volleyball= 9, Soccer= 5) were randomly placed in three experimental groups: pulsed ultrasound, foam rolling, and a control group. DOMS was induced into the participants’ calf muscles. Four assessments: perceived muscle soreness, 1 RM, Range of Motion (ROM) at the knee and ankle, and vertical jump, were measured to quantify DOMS. Measurements were taken before induction of DOMS, as well as 24, 48, and 72 hours post- DOMS. The pulsed ultrasound and foam rolling were performed for five minutes on each calf 24 hours after the calf exercises were performed. No significant difference in any of the assessments between groups were found, except for a significant difference in right ankle extension, $F(6,33) = 3.04, p = .02, \eta_p^2 = .36$. This result must be interpreted cautiously, however, because of the small sample size. To conclude, no significant difference in DOMS between the treatment effects of pulsed ultrasound and foam rolling were noted. Further research should be performed with a larger sample size.
The Impact of Active and Passive Recovery on Blood Lactate Clearance in Sprinters

Allison Baylor

Departmental Affiliation: Kinesiology
College of Arts and Sciences

Project Code: KIN-10

This study investigated the difference in blood lactate clearance between active and passive recovery in D1 sprinters. Blood lactate is an indicator of fatigue, which produces the burning sensation felt during anaerobic exercise. The study was held at a private Midwestern university on the indoor track. Eleven college-aged sprinters, of both genders (Male=9, Female=2), participated. These track sprinters were accustomed to a maximal workout. The intervention was type of recovery. Six of the participants performed active recovery which included self-paced jogging, while five participants performed passive recovery of sitting still. Participants ran a maximal 400-meter dash. Blood lactate was measured via finger prick with the Blood Lactate Pro analyzer. Blood lactate was measured immediately after the 400m sprint and at minutes 10 and 20 post sprint. The blood lactate clearance of the active recovery group (M=3.31, SD=1.08) was significantly higher than the blood lactate clearance of the passive recovery group (M=1.64, SD=.99), t(11)=2.65, p<.05, d=1.52. The null hypothesis is rejected, as a significant difference was revealed between the two intervention groups. The results suggest that the active recovery method is more effective at blood lactate clearance in D1 track sprinters in this study.

Information about the Author(s):
Allison Baylor is a senior exercise science major with a human biology and coaching minor. She would like to continue her studies as an exercise physiologist in the future.

Faculty Sponsor: Kelly Helm

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Muscle Activation and Foot Pressure of College Female Basketball Players with and Without Knee Injury: A Pilot Study

Georgi Donchetz

Departmental Affiliation: Kinesiology
College of Arts and Sciences

Project Code: KIN-11

This study compared muscle activation and foot pressure of DI basketball players, with and without knee injury, while performing a standard rebound drill. The null hypothesis stated no significant differences would be found between injured and non-injured players in muscle activation and in foot pressure during a rebounding drill. The study consisted of seven subjects (injured=2, healthy=5). Six subjects were right leg dominant. Surface electrodes (sEMG) were placed on the right and left biceps femoris and medial and lateral head of gastrocnemius muscles to measure muscle activation. OrpyxLogR® inserts were placed in both shoes to detect foot pressure per square in (psi) during the jumping and landing movement of each rebound. Participants completed five rebounds of a basketball from a Just Jump mat, which measured jump height and airtime. Mean jump height for all the participants was 14.17 in. The OrpyxLogR® software automatically sent data to cloud via Bluetooth technology and calculated psi of each of the five jumps. Muscle activation was recorded with Delsys Trigno™ Wireless EMG System and analyzed with EMGworks® software. Root mean square (RMS) values of sEMG signals were normalized to the highest RMS across all trials. Mean muscle activation scores revealed less activation in all three muscles of injured leg v non-injured leg of one subject. Independent \textit{t}-test revealed no significant differences in foot pressure and muscle activation between injured and non-injured players. The null hypothesis is accepted.

Information about the Author(s):
Georgi Donchetz is a senior exercise science major with a minor in human biology at Valparaiso University. Her future goal is to work as a strength and conditioning coach to help athletes reach their personal and team athletic goals.

Faculty Sponsor: Kelly Helm

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Perceived Levels of Stress and Physical Activity in College Students

Amanda Riley

Departmental Affiliation: Kinesiology
College of Arts and Sciences

Project Code: KIN-2

The purpose of this study was to investigate how college students perceive their stress levels before and after they participate in a physical activity (PA). A survey regarding perceived stress and PA was filled out by 101 students (M=51, F=50) at a private Midwestern University. The survey asked respondents to rank their perceived stress level on a 1 to 5 scale (1 being “low” and 5 being “high”) prior to participating in a PA. The respondents were asked to circle a PA in which they participated. If the respondent did not participate they did not circle a PA. The respondents then were asked how they perceived their stress level after participating. The researcher gathered information from all four classifications of undergraduate students (Freshman=39, Sophomore=32, Junior=19, Senior=11). Descriptive statistics showed that mean perceived stress pre-PA scores were highest among sophomores (M=4.1) followed by juniors (M=3.5), freshman (M=3.1) and seniors (M=2.8). The highest percent decrease in perceived stress post-PA was also shown in sophomores (30.20%, M=2.2) followed by seniors (24.4%, M=1.7), juniors (22.8%, M=2.2), and freshman (21.6%, M=2.0). A mean percent decrease in perceived stress after participating in PA (24.75%) was shown among all college students surveyed. As a result, descriptive statistics showed that students do perceive a lower stress level after participating in a PA than prior to participating in a PA. The researcher concluded that college students may benefit from participating in PA to reduce perceived stress.

Information about the Author(s):
Amanda Riley is an exercise science major with a human biology minor. Her future goals include pursuing a career in sport and medical massage therapy.

Faculty Sponsor: Dr. Kelly Helm

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The purpose of this study was to compare limb dominance and site of injury in college-age students at a Midwestern university. The question to be answered was “Does a relationship exist between limb dominance and site of injury in college-age students?” This study involved the use of pencil and paper surveys and the surveys were handed out at a centralized part of campus that received major student traffic. The survey included 10 questions involving age, gender, physical activity level, arm and leg dominance, number of injuries involving the arm and leg, and the number of injuries that resulted in surgery. The age of the respondents ranged from 18 to 24 years old. Once all of the surveys were completed, all of the data was transferred to a Microsoft Excel spreadsheet. Currently the data is being analyzed in SPSS to determine if a relationship exists between limb dominance and site of injury in college-age students.

Information about the Author(s):
Zach Cutler is an exercise science major who has a human biology minor. Zach Cutler is on the Valparaiso University Men’s Golf team and is originally from Old Monroe, Missouri. Zach Cutler would like to eventually attend chiropractic graduate school.

Faculty Sponsor: Dr. Kelly Helm

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Comparison Between College Students and Community Dwelling Seniors in 30-second Chair Stand Test Performance

Taylor Swanson

Departmental Affiliation: Department of Kinesiology, Exercise Science
College of Arts and Sciences

Project Code: KIN-4

The objective of this study was to compare the mean score on the 30-second Chair Stand Test (30s CST) of college students to the normative data of community dwelling seniors. The questions to be answered were “What is the mean score on the 30s CST for college students?” and “How does the mean score of college students on the 30s CST compare to the mean scores of community dwellers?” One hundred and twenty-four participants (F=53, M=71, ages 18-24) from a Northwest Indiana university participated in this study by completing the 30s CST. The participants were instructed to stand up as many times as possible in 30 seconds using proper form: arms crossed on chest, feet shoulder width apart, fully extending the knees when standing, and fully resting on the chair when sitting. Mean scores by gender, activity level, and college were calculated. The mean scores for female and male college students (F=15.7, M=16.6) were slightly greater than the mean scores of 60-64 year olds (F=14.5, M=16.4), at 1.2 and 0.2, respectively. The mean scores of college students were noticeably greater than 90 -94 year olds (F=8.0, M=9.7), at 7.7 and 6.9, respectively. The researcher concluded little difference exists between college students and 60-64 year old community dwelling seniors in mean 30s CST scores. The efficacy of the 30s CST is more suited to elderly populations, and is neither efficient nor accurate in assessing leg strength in college students.

Information about the Author(s):
Taylor Swanson is an exercise science major currently working with the geriatric population and is interested in fall prediction and prevention. Taylor will be attending St. Ambrose University this fall to earn her Doctor of Physical Therapy and plans to work with the geriatric population as a physical therapist.

Faculty Sponsor: Kelly Helm

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The Impact of Foam Rolling on Hip Range of Motion in Division I Athletes

sarah mythen

Departmental Affiliation: Kinesiology
College of Arts and Sciences

Project Code: KIN-5

Foam rolling has various uses throughout the athletic world. This study aimed to investigate the impact of foam rolling on hip range of motion (ROM). This study compared a foam rolling with stretching group to a control group of stretching only. Participants consisted of healthy Division I male athletes at a small Midwest University (n=30). Participants were randomly assigned to the control group (n=15) or the foam roll group (n=15). The control group performed four static hamstring stretches, held for 30 seconds with 30 seconds’ rest on their non-dominant leg. The foam roll group massaged their hamstring from the ischial tuberosity to the inferior portion of the popliteal fossa for 3 sets of 1 minute with 30 seconds’ rest. Following the foam rolling participants did the same stretching routine as the control group. The hip ROM of the foam rolling group (M=8.88, SD=6.47) was not significantly better than the stretching only group (M=6.09, SD=4.26), t(30)=1.40, p>.05, d=0.093. The null hypothesis was accepted, no difference between the groups were found. These results suggest that foam rolling is no better than a standard stretching routine in improving athletes ROM.

Information about the Author(s):
Sarah Mythen is a senior exercise science major with a chemistry minor. She plans to continue her studies at physical therapy school after college.

Faculty Sponsor: Kelly Helm

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The Effect of an 8-Week Challenge on Weight Loss

Mackenzie Grossmann

Departmental Affiliation: Kinesiology
College of Arts and Sciences

Project Code: KIN-6

The purpose of this study was to observe the effects of an incentivized 8-week weight loss challenge on weight loss. The question to be answered was "will an 8-week incentivized weight loss challenge have an effect on weight loss?". Twelve females between the ages of 37 and 56 participated in the challenge. The subjects put in a certain amount of money and recorded their weight each week. The subject that had the most percentage weight loss at 8 weeks won the money. The subjects chose their own methods of weight loss. A paired t-test was used to analyze the pre and post weight. The data analysis indicated there was a statistical significance (p=.009). The average weight loss was 5.92 pounds. The author concludes that an 8-week incentivized weight loss challenge did have an impact on weight loss.

Information about the Author(s): Mackenzie Grossmann is a senior exercise science major with a human biology minor.

Faculty Sponsor: Dr. Kelly Helm

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Quadriceps Muscle Activation of Division One Swimmers while Performing the LESS Jump

Karen Holmquist

Departmental Affiliation: Department of Kinesiology, Exercise Science
College of Arts and Sciences

Project Code: KIN-7

The purpose of this study was to observe the left and right quadriceps muscle activation while DI swimmers performed the Landing Error Scoring System (LESS) jump. The null hypotheses stated that no differences would be found between the left and right quadriceps muscles and no differences would be found in quadriceps muscle activation between male and female swimmers. Seventeen participants completed the study (F=10; M=7). Surface EMG (sEMG) sensors were placed on the rectus femoris, vastus lateralis, and vastus medialis. Muscle activity was recorded with the Delsys Trigno™ Wireless EMG System. Data was analyzed by EMG works® analysis software. Root mean square (RMS) values of sEMG signals were normalized to the highest RMS values across all three trials. Paired t-tests found no significant differences in right and left quadriceps muscle activations and no significant differences were found between male and female swimmer quadriceps muscle activation while performing the LESS. Therefore, the null hypotheses are accepted.

Information about the Author(s):
Karen Holmquist is an exercise science major with human biology and psychology minors. She is interested in studying biomechanics to prevent injury. Karen plans to pursue a career in physical therapy and earn her certification in exercise physiology.

Faculty Sponsor: Dr. Kelly Helm

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The purpose of this study was to determine if significant activation differences exist in right and left gluteal muscles of Division I swimmers while performing the Landing Error Scoring System (LESS) jump. The questions to be answered were, “Is there a significant difference between the right and left gluteal muscle activation in Division I swimmers?” and “Is there a significant difference between the right and left gluteal muscle activation between male and female Division I swimmers?” A total of 10 swimmers (M=6; F=4) participated. Each participant performed a prescreening FMS and LESS assessment. For the LESS, researchers attached surface electrodes to the gluteus medius and gluteus maximus of each participant. Participants performed three countermovement LESS jumps. Electromyograms (EMG) of each countermovement jump were recorded with Delsys™ and analyzed using EMGworks®. Data analysis consisted of normalizing the root mean square (RMS) of the three trials to the peak RMS. Independent samples t-tests were revealed no differences between right and left gluteus medius and no differences between right and left gluteus maximus in male and female swimmers. No significance differences were found in gluteal muscle activations between male and female swimmers. Researcher concludes that in healthy swimmers with good functional movement, gluteal muscle activation seems very similar when performing the LESS movement.

Information about the Author(s):
Selena Gonzalez is an Exercise Science major with a Human Biology and Psychology minor.

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Assessment of Muscle Activation in Landing Error Scoring System Performance in Collegiate Swimmers

Serena Badgley

Departmental Affiliation: Exercise Science
College of Arts and Sciences

Project Code: KIN-9

The Landing Error Scoring System (LESS) is a qualitative tool used to assess jump and landing biomechanics. The objective of this study was to compare the muscle activation in the right and left gastrocnemius muscles in collegiate swimmers while performing a LESS jump. The null hypothesis stated no significant differences would be found between right and left muscle activation levels, nor would differences be found between genders. Eighteen participants (M=9; F=9) volunteered to be pre-screened and assessed with the Functional Movement Screen™ and the LESS jump. Research took place at a small private university in the Midwest. During the assessment, surface electrodes were placed on the participants’ gastrocnemius muscles to record muscle activation while performing the LESS. Data was analyzed through Delsys EMGWorks® software. Root mean square (RMS) values of surface EMG signals were normalized to the highest RMS across the three trials. Combined means of eccentric and concentric muscle activation of each participant was calculated. Paired t-tests comparing right with left gastrocnemius muscle activation values for both males and females indicated no statistically significant differences. The null hypothesis is accepted; no significant differences were found at the p<.05 level of significance. The researcher concludes that the LESS may be a better tool for assessing jumping mechanic error of healthy athletes rather than muscular activation assessment.

Information about the Author(s):
Serena Badgley is a senior exercise science major, with human biology and psychology minors. Next year she will be attending University of Puget Sound to pursue a master's degree in occupational therapy.

Faculty Sponsor: Dr. Kelly Helm

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Interesting patterns are everywhere we look, but what happens when we try to avoid patterns? A permutation is a list of numbers in a specific order. When we avoid a pattern, we try not to order those numbers in certain ways. For example, the permutation 45312 avoids the 123 pattern because no three elements in the permutation are in an increasing order. In our work, we studied the permutations that avoid two different patterns of length three. We focused on the distribution of peaks, valleys, double ascents, and double descents over these sets of permutations.

Information about the Author(s):
Teresa Wheeland is a sophomore math and secondary education major, Nicholas Lewandowski is a sophomore math and secondary education major, Ryan Kulwicki is a junior math and computer science major, Jacob Roth is a sophomore math and computer science major, and Michael Bukata is a sophomore math major.

Faculty Sponsor: Lara Pudwell

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Agent-Based Modeling of Pollen Competition

Katherine Bassett

Departmental Affiliation: Mathematics
College of Arts and Sciences

Project Code: MA-2

Non-random mating in *Arabidopsis Thaliana* is, at least in part, due to intense competition between pollen grains to fertilize the limited number of ovules. Previous studies have pinpointed some of the competition traits that make pollen more or less competitive. Using these competition traits, we will build an agent-based computer model with NetLogo that simulates the competition between two accessions of *Arabidopsis Thaliana* pollen. This 2D model will allow the user to adjust pollen traits and competition strategies for each of the two pollen accessions. Some of the factors being considered include pollen viability, pollen tube growth rate, nutrients provided by the female, pollen tube attrition and the means of locating unfertilized ovules. To assess the competitiveness of the selected pollen traits, this model will track the number of fertilized ovules and maximum pollen tube length for each accession. This agent-based model will allow further study into the traits that make pollen most competitive as well as the strategies used by pollen to fertilize ovules. This model has the potential to quickly test a wide variety of competition traits and strategies without the need for in-lab experiments.

Information about the Author(s):
I am currently a Sophomore Mechanical Engineering student with minors in Mathematics, Environmental Studies and Electrical/Computer Engineering. I first became involved with this research by taking a math class titled 'Plant Sex'. This math/bio class, revolved around the topic of pollen competition and modeling. I became fascinated with the idea of building computer models to learn about real world systems. At the end of the term, I joined the professors' research team.

Faculty Sponsor: Alex Capaldi

Student Contact: Katherine Bassett katherine.bassett@valpo.edu
Mathematical Modeling of the Evolution of the Domestic Dog

Ashley Hire, Michael Revor, Samuel Iselin

Departmental Affiliation: Mathematics
College of Arts and Sciences

Project Code: MA-3

The domestication of the gray wolf (Canis lupus) is generally thought to be the earliest example of animal domestication by humans. Yet, the processes which gave rise to it are still relatively unknown. There are two prominent hypotheses: that the wolf was domesticated by human intentional breeding or that wolves essentially domesticated themselves. In the latter case, wolves who were more tolerant of humans and more willing to enter early human settlements gained an evolutionary advantage over those that were not willing to do so. We have developed an agent-based (mathematical and computer) model (ABM) to simulate this second scenario. The model incorporates availability of food sources, time spent with humans, the tameness of the wolves, reproduction, and death, with the values of these parameters being informed by the literature. Ultimately, we would also like to build an ABM of the first scenario (human intentional breeding) with the goal of comparing simulated domestication times of the two scenarios to archaeology evidence of when wolves were domesticated. This would allow us to determine which hypothesis is most probable.

Information about the Author(s):
Ashley Hire is a sophomore math and secondary education double major, with a minor in chemistry. Her interest in science and math alike promotes her interest in this topic.
Samuel Iselin is a junior math and computer science major. He has had previous experience with SOURCE projects, and is also very interested in environmental science, making this project a very fitting one.
Michael Revor is freshman math major. Although he is a freshman, Michael has a passion for math and is a vital part to this project.

Faculty Sponsor: Alex Capaldi

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Solar Eclipse Radiosonde Launch Project

Kristen Axon, William Wight, Erika Goshorn, Aaron Mehner, Cole Evans, Seth Tacke, Adam Stepanek,

Departmental Affiliation: Meteorology
College of Arts and Sciences

Project Code: MET-1

On August 21, 2017, the United States experienced a total solar eclipse from coast to coast for the first time in 38 years. This event provided a unique opportunity to study the vertical profile of the atmosphere during the duration of a solar eclipse through the deployment of instrumented balloons capable of measuring temperature, wind speed and direction, and humidity. Six students and three faculty members from Valparaiso University worked in cooperation with the University of Montana in an effort to coordinate radiosonde launches across the path of totality in North America. Four launches were conducted in Coulterville, Illinois measuring the state of the atmosphere before, during, and after the event. Goals of this project centered on the eclipse’s impact on temperature, barometric pressure, humidity, and wind variations from the surface to the middle of the troposphere. Key discoveries include a decrease in both surface temperature and dew point coincident with an increase in wind speed, particularly during and after eclipse totality. Temperature was measured in ten minute intervals with an eclipse-driven minimum temperature observed two minutes after totality. Winds near the surface continually increased between the first and third launches while a slight decrease was measured after the fourth launch. It is hypothesized the fluctuations in wind speed are a consequence of temperature changes within the boundary layer.

Information about the Author(s):
The authors for this project include six undergraduate students and one faculty member who worked in conjunction with the University of Montana. The goals for this project were to assist in atmospheric data collection during a total solar eclipse for a nationwide project while also providing research experience and skills for the students involved. The observed data is currently going through a base analysis with the potential future goal to examine the data more thoroughly. Interest for this project stemmed from the relevance to meteorology as well as the project's focus on a rare and fascinating solar event. Since a total solar eclipse is not a frequent event in the U.S., collecting data during one improves the scientific community’s understanding on a variety of information surrounding it.

Faculty Sponsor: Adam Stepanek

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Identification of Differences in Composite Vertical Profiles Between November Lake-Effect and System Snow Events in Northwest Indiana

Evan Cade, Timothy DeRolf, Samantha Schletz

Departmental Affiliation: Meteorology
College of Arts and Sciences

Project Code: MET-2

This research investigates the differences between vertical profiles of atmospheric variables for November system and lake-effect snow events that occurred in Northwest Indiana. Over 900 12-UTC soundings from 1957-2012 were collected using the Green Bay sounding station (KGRB; 72645) and categorized into system or lake-effect events. The data were interpolated to every millibar and composited by category to facilitate the discovery of potential differences between them. Properties examined include wind speed and direction throughout the troposphere, inversion height, moisture profile, lifting condensation level, as well as temperature. Overall, the two composite profiles demonstrate noticeable differences in the height of low-level temperature inversions, dewpoint depression profiles up to 300 hPa, and wind direction below 850 hPa. These differences illustrate the distinct atmospheric conditions favorable to Northwest Indiana lake-effect snow compared to system snow events.

Information about the Author(s):
Evan Cade is from New Palestine, Indiana, Timothy DeRolf is from Munster, Indiana, and Samantha Schletz is from New Lenox, Illinois. All three are freshman majoring in meteorology at Valparaiso University in Indiana, and Timothy also is majoring in mathematics. They have all shown an interest in meteorology since a young age because of the diverse weather conditions they have experienced living in the Midwest. While they all eventually want to research different fields in meteorology, lake-effect snow is an event that they all have personal experience in. They hope to use the skills learned in undergraduate research in future careers.

Faculty Sponsor: Dr. Kevin Goebbert
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A Computational Study of Cu-Pd for Electrochemical CO2 Reduction

Marcus Ochsendorf

Departmental Affiliation: Visiting Faculty Program at Argonne National Laboratory
College of Arts and Sciences

Project Code: PHYS/ASTR-1

In this study, copper and palladium clusters supported on defective graphene were investigated as catalysts for the electrochemical reduction of CO2 using the first-principles approach and the computational hydrogen electrode model. The limiting potential to reduce CO2 to CH4 using these metallic catalysts was determined. From this, it was determined that the palladium clusters were the best candidates. These clusters showed the lowest necessary overpotential to produce CH4 out of all the catalysts studied. Reaction pathways to produce a variety of C1 products CO, HCOOH, HCHO, CH2OH, and CH4 were studied in detail for selected systems. Results of this analysis will be presented.

Information about the Author(s):

Faculty Sponsor: Haiying He

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Screening Single-Atom Catalysts for Propane Dehydrogenation

Christopher Bean, Stan Zygmunt

Departmental Affiliation: Physics and Astronomy
College of Arts and Sciences

Project Code: PHYS/ASTR-2

Recent interest in so-called single-atom catalysts raises the question of how single transition metal atoms differ in reactivity from small atomic clusters and bulk systems. As a first step toward more extensive modeling of propane dehydrogenation catalysis by transition metal atoms on a graphene support, we have studied the interaction of transition metal atoms with propane using density functional theory as implemented in the VASP program. The climbing-image nudged elastic band algorithm was used to identify the minimum energy pathway for the rate-limiting step of this reaction. We compared the calculated activation energies for this reaction step with simple properties of the transition metal atoms, such as electron affinity and ionization energy, that might be correlated with the activation energies. While certain atoms stand out as promising catalysts, this survey reveals other interesting properties of this reaction, such as spin state changes, that merit further study.

Information about the Author(s):
Christopher Bean is an undergraduate physics and secondary education major who began working with the computational catalysis research group during the summer of 2017. He is planning to teach physics at a high school level and use his research experience to enrich his students' educational experience and opportunities.

Faculty Sponsor: Stan Zygmunt

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Analysis of Neutral Pion Asymmetry with the STAR Detector

Alec Hauck, Noah Strand

*Departmental Affiliation:* The Department of Physics and Astronomy
College of Arts and Sciences

*Project Code:* PHYS/ASTR-3

Although the quark contribution to the proton’s spin is well known, the gluon contribution to the spin is relatively poorly constrained. In order to further constrain this gluon contribution, part of the Solenoidal Tracker at the Relativistic Heavy Ion Collider (RHIC) (STAR) collaboration analyzes collisions between different alignments of longitudinally spin-polarized proton beams. These collisions produce varying amounts of neutral pions which most commonly decay into photon pairs, some of which are then identified in the Endcap Electro Magnetic Calorimeter (EEMC) within the STAR detector. The EEMC makes measurements in a pseudorapidity range of $1 < \eta \leq 2$ with full azimuthal coverage. The Shower Maximum Detector (SMD) is particularly useful in determining the positions of energy readings in the EEMC which we label as clusters. These clusters, caused by photons, are then used to reconstruct the neutral pions. From these reconstructed pions, a corrected number of pions is determined by fitting templates from Monte Carlo simulation to the pion mass distribution data. We will describe the current state of the analysis including cluster identification and neutral pion data and simulation.

*Information about the Author(s):*

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Describing the Binary System PHR J1510-6754 with Modeling and Spectroscopy Analysis

Kathryn Willenbrink

Departmental Affiliation: Physics and Astronomy
College of Arts and Sciences

Project Code: PHYS/ASTR-4

The purpose of this project is to describe the central binary system of planetary nebula PHR J1510-6754 through binary modeling and spectral analysis from existing data. It is well known that the morphology of planetary nebulae is affected by binary central stars, and this system indeed is a binary system based on its light curve. No prior binary analysis has been completed thus far on the object. Spectral classification will allow for the binary modeling to have fewer variables by giving the temperature and limits on the radius of the cooler star in the system. The binary modeling will provide the values of the radii and mass of each star, the temperatures of both stars, the orbital period and inclination of the system. Analysis of both the binary modeling and the spectra of the system will also allow analysis of the distribution of the irradiation on the cool star, something that has not been done before experimentally.

Information about the Author(s):

Faculty Sponsor: Dr. Todd Hillwig

Student Contact: Kathryn Willenbrink kathryn.willenbrink@valpo.edu
TiO2 is known to be widely used in photocatalytic and photovoltaic applications. TiO2 alone, however, still suffers from the low quantum efficiency due to the electron-hole recombination. Silicene, a 2D monolayer composed of Si atoms, is known to have higher chemical reactivity than graphene. It may be a viable substrate for TiO2. The high conductivity of silicene may help charge separation after the photoexcitation. The composite system of TiO2 and silicene may provide superior properties than the individual entities. In this study I am investigating different TiO2 nanoclusters and nanolayers and their interaction with silicene. The optical and electronic properties of the combined system of TiO2 and silicene were calculated using the Density Functional Theory (DFT). Preliminary results reveal that combined systems do show different characteristics.
The goal of the nEDM experiment at Los Alamos National Laboratory (LANL) is to improve the current upper limit of the magnitude of the neutron’s electric dipole moment (nEDM) to an accuracy of approximately $10^{-27}$ e $\cdot$ cm. The experiment will make use of the Ramsey method of oscillatory magnetic field pulses to determine the value of the neutron’s precession frequency, both before and after an electric field is applied. The change in this precession frequency can then be used to calculate the nEDM. In the experiment, ultra-cold neutrons travel from the source into a chamber, where the Ramsey magnetic field pulses are applied. They then connect to a detector that measures the polarization of the neutrons. A turntable switcher was constructed to form connections between the source, Ramsey field chamber, and detector. Controlled by a rotary motor, the switcher turns to orient guide pipe sections, first connecting the source to the field room and then the field room to the detector. Discussion of switcher assembly, as well as results of switcher configuration, will be presented.

Information about the Author(s):

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Comparison of Normal and Ultra-Diffuse Gas Rich Galaxies

Andrew Webb

Departmental Affiliation: Physics
College of Arts and Sciences

Project Code: PHYS-3

The goal of this project is to better understand star formation in a strange new class of galaxies called ultra-diffuse galaxies (UDGs), which are galaxies with very low stellar densities (i.e. only a few stars per unit area) compared to typical galaxies. I have specifically aimed to determine if UDGs that have the fuel to form stars (i.e. HI) have different properties from “normal” galaxies that also have the fuel to form stars. By doing this, I uncover differences that explain why their stars are so diffuse, and eliminate hypotheses that predict observable differences. The steps of this project each involve a comparison between galaxies in one galactic characteristic. I compare the color of galaxies, followed by the presence of a neighbor galaxy and whether or not the presence of neighbor galaxies affects color. Finally, the rotation of UDGs is compared to normal galaxies. The results from each of these parts better constrain the properties of UDGs containing atomic hydrogen - the fuel for star formation. Radio wavelength observations, which give us information about the atomic hydrogen, will primarily be taken from the ALFALFA survey, which has taken electromagnetic spectra of tens of thousands of individual galaxies with the Arecibo Observatory. Visible light images and data was obtained from the publicly available Sloan Digital Sky Survey. The approximate sample sizes for this project is between 70 and 250 ultra-diffuse galaxies (depending on how low in stellar density we will define a diffuse galaxy to be) compared to 10,000 other non-ultra-diffuse “normal” galaxies (the 10,000 least diffuse we can find).

Information about the Author(s):
I am Andrew Webb and am from Asheville, North Carolina. I have always been interested in astronomy and space. Since high school, I was a part of an astronomy club and made trips to tops of mountains to look at stars. I will be graduating this May with a Bachelor's degree in Physics, and plan to pursue a career in environmental science and sustainability.

Faculty Sponsor: Luke Leisman

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Minimizing the Residual Field and Field Gradient in a Magnetically Shielded Room for nEDM at LANL

Chamindu Amarasinghe

Departmental Affiliation: Physics
College of Arts and Sciences

Project Code: PHYS-4

The LANL neutron Electric Dipole Moment (nEDM) experiment is an effort to set a sensitivity limit of $3.2 \times 10^{-27}$ e·cm on the electric dipole moment of the neutron, an order of magnitude smaller than the current upper limit. This measurement uses Ramsey’s method of oscillating magnetic fields. The magnetic field and field gradient have to be low enough to avoid the smearing of the Ramsey fringes and increase the neutron dephasing time respectively. The experiment is enclosed in a two layer Mu-metal magnetically shielded room (MSR) to null any external magnetic fields from the environment. The MSR is degaussed to sufficiently reduce its residual magnetic field and field gradient. The MSR is designed for residual fields as low as 30 nT. The experiment further requires a field gradient of 1 nT/m or smaller. Here we report on the degaussing procedure and the resulting improvement in the shielding prowess of the MSR.

Information about the Author(s):

Faculty Sponsor: Shirvel Stanislaus

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Calculating the Minimum Energy Crossing Point for Chemical Reactions with Intersecting Potential Energy Surfaces with Different Spin States

Nathaniel Bouman

Departmental Affiliation: Physics
College of Arts and Sciences

Project Code: PHYS-6

For reactions with products in a different spin state than the reactants, the change of spin state along the minimum energy reaction pathway occurs at the minimum energy crossing point (MECP). This point is of particular interest for reactions where it dictates the activation energy required for the reaction. For such reactions, it is useful to determine the crossing point and its energy with precision. To accomplish this, a Python program was written to make calls to the Vienna ab-initio simulation package (VASP) electronic structure program. The energy and atomic forces for a particular molecular geometry in different spin states were calculated using VASP. These were used to iteratively update the geometry to approach the MECP using a previously published algorithm that was modified to work with VASP. In order to test the algorithm, results are presented and compared to previous MECP calculations. Finally, original MECP calculations are carried out for the propane dehydrogenation reaction catalyzed by transition metal atoms. These reactions are currently being studied in our research group in order to evaluate single-atom catalysts for propane dehydrogenation.

Information about the Author(s):
Nathaniel Bouman is a triple major in Computer Science, Physics, and Humanities, hoping to pursue a career in software development. He was interested in this project for his physics senior research as it gave him the opportunity to develop software that would fulfill an immediate need for the research group. It also fulfilled his interest in carrying out research which utilized a cluster computer.

Faculty Sponsor: Stan Zygmunt

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Juvenile Transfer in Toliver vs. the State of Arkansas

Chloe Castelluccio

Departmental Affiliation: Psychology/Sociology
College of Arts and Sciences

Project Code: PSY/SOC-1

In our criminal justice system, there is a division between the juvenile justice system and the adult justice system. This brief will address why this division exists by examining the case of Lynn Toliver vs. State. In this case, a sixteen year old male was charged with aggravated robbery, kidnapping, and theft of property. Due to his history in the system and the nature of his crimes, he was tried as an adult on all charges despite requests and appeals to remain in the juvenile justice system. He should be tried as a juvenile and not as an adult because the juvenile system offers more rehabilitation and because the mind of a juvenile is not yet fully developed enough to make an informed decision that considers the consequences of his or her actions. Because of this, Toliver should be allowed to be tried as a juvenile rather than as an adult.

Information about the Author(s):
My name is Chloe Castelluccio and I am a junior majoring in Psychology and Criminology and will be adding a minor in the Humanities. I will be graduating in May 2019. This topic interests me because I want to work in the prison system, and I have a particular interest in working with juveniles.

Faculty Sponsor: Amanda Zelechoski

Student Contact: Chloe Castelluccio chloe.castelluccio@valpo.edu
Amicus Brief for Marilee Patricia Garner

Dariane Okeley

Departmental Affiliation: Psychology
College of Arts and Sciences

Project Code: PSY-1

This paper explores the question of whether juveniles should be held to the same decision making capabilities as adults. This question has been a topic of discussion for many years. The court case of Marilee Patricia Garner, 16, suggests that juveniles are more reckless, less mature, and have less understanding of consequences than adults do. Garner was charged as an adult with two counts of murder, a first-degree felony, after rear-ending a car and killing two people. This paper examines research that shows evidence that juveniles should not be held to the same decision making capabilities as adults since they are less mature and are often influenced by others.

Information about the Author(s):
I am a senior Psychology major here at VU. I am currently taking Psychology and Law. In the class we are learning about amicus briefs and with research, this is my chosen topic.

Faculty Sponsor: Amanda Zelechoski

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Amicus Curiae Brief

Alex Nicishatse

Departmental Affiliation: Psychology
College of Arts and Sciences

Project Code: PSY-10

The issue involved in this case is "whether applying Colorado's public accommodations law to compel the petitioner to create expression that violates his sincerely held religious beliefs about marriage violates the free speech or free exercise clauses of the First Amendment." According to Phillips, he is a specialist in custom made cake designs. As stated in his Masterpiece's website states, Phillips is able to make any custom made cake for all his clients. However, I support Phillips' stand for refusing to make a custom made cake that goes beyond his religious beliefs that he holds strongly and respects. Making a rainbow-layered specialty cake that represents the same-sex marriage goes against what Phillips' religious beliefs and puts him in a difficult position where he has to choose between serving his customers and going against his personal religious beliefs that prohibit any support of same sex-marriage. Given that the rainbow-layered cake is a reflection of the values of the gay community, if Phillips has never participated in the creation of a rainbow-layered cake previously which he considers well associated with the gay community, hence he has a right to turn down the offer from the in accordance to his rights to Free Speech or Free Exercise. A request made for the creation of a custom made designed cake does not necessarily mean that Phillips has to comply with the request. As such, I see no wrong with the refusal of Phillips to create a cake that contravenes his strongly held religious beliefs.

In retrospect, everyone is entitled to their own values and beliefs regardless of what other people believe. However, such beliefs should not cause harm to others when being exercised. As such as Phillips should be tolerant and respectful to his customers' beliefs, there should also be tolerance and respect to his religious beliefs by not forcing him to create a cake that opposes his religious values. In this sense a line must be drawn on ensuring that a person's or groups' beliefs do not harm those of others.

Information about the Author(s):
I was intrigued by this topic because of the current event on immigration and religious. To label certain groups or religious of person, it goes against everything that I stand for because we outer to treat everyone with respect and dignity despite what are their beliefs. We all have rights to refuse offers or services that goes against what we stand for. We all created equal regardless your background, color, and religion.

Faculty Sponsor: Amanda Zelechoski

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Graduate Students as Future Mandated Reporters

Emily Mellin

Departmental Affiliation: School Psychology
College of Arts and Sciences

Project Code: PSY-11

This study focuses on the departments of Clinical Mental Health Counseling, Nursing, and Education at Valparaiso University to explore the preparedness of graduate students as future mandated reporters. The goal is to ascertain how graduate students in career fields responsible for working directly with children learn about and experience the topics of child maltreatment and mandated reporting in their graduate training programs. The overall purpose is to understand and inform graduate students and programs of the current state of training, including identifying critical gaps and potential action steps, used to prepare school psychologists, counselors, nurses, and educators for their future roles as mandated reporters.

Information about the Author(s):
Emily Mellin is a second-year school psychology student who has been a graduate research assistant within the Department of Education since 2016. As a future mandated reporter herself, she finds the need to study the training of mandated reporters of the utmost importance. She hopes to pursue a doctoral degree after she finishes her specialist degree here at Valparaiso University.

Faculty Sponsor: Sara Golomb

Student Contact: Emily Mellin emily.mellin@valpo.edu
The Role of the Imagination in Religion and Science

Jonah Koetke

Departmental Affiliation: Psychology
College of Arts and Sciences

Project Code: PSY-12

Western culture has seen a separation between two once-connected disciplines: the scientific and the religious. The religious is part of the humanities, thus it utilizes imagination, while the world of the scientific is based in objective facts. However, this description of the separation between these disciplines does not suffice. I posit that both of these realms use an aspect of the imagination, just with different ends in mind and different mindsets. In order to show this, I will be utilizing the psychological framework developed by Jerome Bruner in his book, Actual Minds, Possible Worlds, focusing on pragmatic and narrative mindsets. I will also be relying heavily on the work done by Garett Green in his book, Imagining God, who attempts to breach this same divide by looking at it from a purely theological perspective. Crossing the gap can be done by seeing science and religion as both using the world-making tool of imagination. This paper will begin with an examination of Bruner’s framework, followed by an analysis of how each of these mindsets utilize their own form of imagination as a tool in their respective disciplines: the pragmatic in the scientific world, and the narrative in the religious. After this I will examine how one can communicate across this seemingly growing divide between worlds, opening the way for further collaboration between science and religion, as well as assisting in reducing conflict between them.

Information about the Author(s):
Jonah Koetke is a Psychology major at Valparaiso University. He has minors in Sociology, Theology, and the Humanities. His research interests include Social Psychology, especially related to social justice, and the intersection of Psychology and Religion. He hopes to go into a Social Psychology graduate program after graduation.

Faculty Sponsor: Jim Nelson Ph.D.

Student Contact: Jonah Koetke jonah.koetke@valpo.edu
Mature Minor Doctrine

Katherine Barbian

Departmental Affiliation: Psychology
College of Arts and Sciences

Project Code: PSY-13

Abstract
This brief will explore the legal topic of the mature minor doctrine, and developmental differences in decision making between adolescents and adults. In the state of Connecticut minor children under the age of 18 are unable to make their own medical decisions. Such as consenting to lifesaving treatment or preventative care. In the case of the Supreme court of Connecticut versus 17-year-old Cassandra C., Cassandra was found medically incompetent to decide on her cancer treatment plan. To better inform the court, this brief will cover several research articles discussing the maturity and competence of adolescents in the medical decision-making process. The current literature suggests that adolescents have less developed decision-making processes compared to adults. Many states require parental consent for the medical treatment of mature minors, including Connecticut. While the mature minor doctrine is a legal agreement accepted by other U.S. states, stating matured unemancipated minors may make their own medical decisions without the consent of their parents. The current literature does support that there is a decision-making difference between adults and adolescents, yet through medical competency testing, a mature minor can come to a reasonable decision on his or her own treatment plan. In the case of Connecticut versus Cassandra C., a medical competency test could be used to determine her ability to decide upon her own treatment.

Information about the Author(s):
Katherine is an undergraduate psychology major and social work minor at Valparaiso University. In Fall of 2017, Katherine completed an internship at the Northwest Indiana Special Education Cooperative, where she worked in a middle school classroom. Katherine currently works at an adolescent rehabilitation center where she complies with client treatment plans. Katherine will be graduating in December of 2018 and plans to attend graduate school to further her career working in school systems.

Faculty Sponsor: Amanda Zelechoski

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Morgan Geyser was sentenced to 40 years in a psychiatric hospital after her and her friend both 12 years old at the time attempted to murder their friend in the woods by stabbing her. Geyser pleaded guilty to attempted first degree intentional homicide in a deal for the prosecution to not seek a prison sentence. It has been stated that Ms. Geyser is delusional as a result of schizophrenia and psychotic spectrum disorder which was also argued in the case for whether the facility in which she would be admitted be less restrictive or more restrictive depending on the prevalence of her disorders and her likelihood to do harm. Her release can be petitioned as soon as six months. As in Wisconsin the law allows for an individual in a psychiatric facility to be released early with continued compliance.

Information about the Author(s):
Allison Abayay is a Psychology major with a criminology minor. These two topics really work well with this case as we look and mental health and the criminal justice system. With Slenderman being such a large social media topic as well as an entertaining game the case caught the eye of many.

Faculty Sponsor: Amanda Zelechoski

Student Contact: Allison Abayay allison.abayay@valpo.edu
Amicus Curiae Brief on “Minor Plaintiffs v Thunder Bay Transportation Authority”

Allyse Donarski

Departmental Affiliation: Psychology  
College of Arts and Sciences

Project Code: PSY-2

I will be submitting an Amicus Curiae Brief on a current civil case in Michigan, “Minor Plaintiffs v Thunder Bay Transportation Authority,” in which I research company liability for sexual assaults perpetrated by an employee. This case stems off of a 2016 closed case, “State of Michigan v Andrew Bartz”, whereas Bartz was convicted of molesting multiple special-needs children while they were on the Thunder Bay Transportation Authority (TBTA) bus line. Bartz, an employee of TBTA, he took advantage of the children of the bus sexually. TBTA had cameras on the bus line, but Bartz was not caught for his criminal behavior for over a year. “Minor Plaintiffs v Thunder Bay Transportation Authority” is a civil case where the families of the victims are seeking justice for TBTA’s negligence in not checking the videotapes and seeing Bartz’ misconduct. Currently, TBTA’s attorney has contracted a neuropsychology facility to diagnose the children’s psychological damage from the assaults; they plan to use this information to monetarily compensate the victims based on the number of sexual assaults the children suffered and the psychological damage and trauma each child sustained.

My Amicus Curiae Brief will be an argument of how the court should favor in the case of “Minor Plaintiffs v Thunder Bay Transportation Authority” based on empirical research that I conduct on the issue of company liability and subsequent compensation for sexual assaults perpetrated by an employee of said company. The empirical research will be primarily from literature found on legal and neuropsychological databases.

Information about the Author(s):  
Allyse Donarski is a senior undergraduate student at Valparaiso University in the College of Arts & Sciences. She is a student leader in Student Senate, an intern for the Valpo SAAFE Office, and does research for Dr. David Rowland in the Psychology Department. She will be graduating in Fall of 2018 with a B.A. in Psychology with a minor in Sociology. After graduation, she plans to continue her education and earn a PhD in Clinical Psychology.

Faculty Sponsor: Dr. Amanda Zelechoski

Student Contact: Allyse Donarski allyse.donarski@valpo.edu
Reid v. Wetzel Amicus Curiae Brief

Magdalena Bonilla

Departmental Affiliation: Psychology
College of Arts and Sciences

Project Code: PSY-3

In Reid v. Wetzel, a class action lawsuit was filed against the Pennsylvania's Department of Corrections (DOC) for housing death-sentenced prisoners in permanent solitary confinement. These prisoners spend 90-100% of their day in their cells in conditions that can damage a person's mental health and any existing mental illness. There are multiple studies which have shown the negative effects of solitary confinement on a person's mental health. Some of the consequences include increases in self-harm and suicide. Under the Eighth Amendment, cruel and unusual punishment should not be inhibited by the federal and/or state government. Having prisoners exposed to prolonged isolation is a form of cruel and unusual punishment because of the devastating effects it can have on a person. Under the due process clause of the Fourteenth Amendment, no person shall be deprived of life, liberty, or property without due process of the law. Prisoners confined to their tiny cell until they die or have their capital sentence overturned is restricting them of their basic rights as a U.S. citizen. Therefore, the practice of using solitary confinement for death sentenced prisoners violates the Eighth and Fourteenth Amendment.

Information about the Author(s):
My name is Magdalena Bonilla. I am a senior at Valparaiso University. I am majoring in Psychology and minoring in Criminology. I am currently interning at Porter County's Prisoners and Community Together (PACT) office which is a community based correction. I became interested in the topic because I think that using isolation as punishment in a prison environment goes against the basic rights of U.S. citizens. I hope to educate others and bring more awareness about this topic. This is also a way to advocate for those who cannot necessarily speak out for themselves because of the situation they are in.

Faculty Sponsor: Amanda Zelechoski

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Com v Dillion Amicus Brief

Kayla Jenkins

Departmental Affiliation: Psychology
College of Arts and Sciences

Project Code: PSY-4

In the 1986 case of Commonwealth of Pennsylvania v. Dillon, Carol Dillon was found guilty of murder in the third degree after stabbing her husband to death. In this case, expert evidence for the defense was denied due to the Commonwealth of Pennsylvania not acknowledging battered women’s syndrome as an adequate self-defense argument. In this poster I will be arguing against the dismissal of expert evidence regarding battered women’s syndrome based on legal precedent and current psychological literature.

Information about the Author(s):
Kayla Jenkins is a senior Psychology major at Valparaiso University. After graduation, Kayla plans on attending IUPUI to pursue a Masters degree in Social Work. Kayla hopes to advocate for victims of abuse in her future career.

Faculty Sponsor: Dr. Amanda Zelechoski

Student Contact: Kayla Jenkins kayla.jenkins@valpo.edu
Rolando Ruiz v. Texas: Assessing the Psychological Impacts of Extended Solitary Confinement on Death Row Inmates

Zoe Fischer

Departmental Affiliation: Psychology
College of Arts and Sciences

Project Code: PSY-5

The 2017 Supreme Court case *Rolando Ruiz v. Texas* brought the debate surrounding solitary confinement and death row conditions to the fore, in Ruiz's appeal for a stay of execution so that the Court may further consider his case. Awaiting execution in solitary confinement for 22 years, Rolando Ruiz suffered psychological symptoms characteristic of extended solitary confinement and threat of execution, including depression, suicidal thoughts, and hallucinations. While some research is critical of these effects and no two inmates' experiences are the same, many recent studies suggest that the negative conditions of solitary confinement, like almost-constant isolation and prevention of contact with others, can have profound psychological effects on a person over long periods of time, particularly with the added stressor of an impending execution. Inmates with and without mental illness can experience decreased concentration, violent fantasies, anxiety, depression, paranoia, and more (Cockrell, 2013) in solitary confinement. Some inmates awaiting execution in solitary might even dismiss their appeals, bringing about their execution faster to end their lives in death row isolation (Johnson, McGunigall-Smith, Miller, & Rose, 2014). Enlightened by psychological research of these threats to inmates' psychological health, this Amicus Brief argues in favor of Ruiz and future appellants whose extended solitary confinement has negatively affected them. This Brief supports Ruiz's appeal for a stay of execution and subsequent review of his case in the hopes that the Supreme Court takes into account current psychological research to assess the constitutionality of extended stays in solitary confinement on death row.

Information about the Author(s):
Zoe Fischer is a sophomore psychology and professional writing double major from Joliet, Illinois. She is also a Christ College scholar, as well as a lover of reading, writing, and research projects like the one above. Zoe hopes to pursue further education in graduate school, where she will continue studying and working with prison systems, inmate rights, race, and gender issues among other meaningful projects.

Faculty Sponsor: Amanda Zelechoski

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Calibrating Electroencephalography and Stimulation Tracking Devices for the Study of Event-Related Potentials

Inga Majewska, Lynda Arredondo, McKayla Deleon, Andrew Butler

*Departmental Affiliation:* Psychology Department
College of Arts and Sciences

*Project Code:* PSY-6

We use information from multiple senses during perception, learning, and memory. Much is unclear about the ways in which multisensory experiences modulate measures of subsequent processing in the brain in conjunction with behavioral measures of memory. The current project uses Electroencephalography (EEG) and behavioral measures to study these phenomenon. EEG is a non-invasive electrophysiological monitoring method used to record electrical brain signals. EEG’s ability to track temporal brain activity with a fine resolution has made it a staple in the field of bio-psych research. Valparaiso University’s Psychology Department recently acquired a new EEG device along with a stimulation tracker to be used for research studies. Crucially, this new technology allows us to study event-related potentials (ERPs). ERPs reflect the brain's response to specific stimuli and tasks. This opens the door for more sophisticated studies and measurements in our lab. Therefore, one purpose of this project was to help calibrate the two devices with one another and conduct pilot studies to use the devices in future research studies. In addition, we aim to provide further insight into how simultaneous auditory and visual information may aid in encoding and recalling visual stimuli.

*Information about the Author(s):*
Inga Majewska, Lynda Arredondo, and McKayla Deleon are students of Valparaiso University studying psychology and/or biology. While having differing interests, ranging from neuroscience to clinical psychology, they all have an interest in brain functioning. They sought the opportunity to work with Dr. Andrew Butler, who recently helped acquire brand new electroencephalography and stimulation tracking equipment. Dr. Butler has been mentoring these students in setting up and maintaining the equipment while running pilot studies and explaining how the equipment functions in studying event-related potentials. The students and their mentor are looking forward to using the equipment to further develop the extent of future research studies on campus.

*Faculty Sponsor:* Dr. Andrew Butler

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False Confessions

chanice youell

Departmental Affiliation: Psychology
College of Arts and Sciences

Project Code: PSY-7

False confessions are one of the main causes of wrongful convictions. Coercive and psychologically damaging interrogation tactics lead to these confessions. Race and socioeconomic status are also relevant to the likelihood of a false confession as Black males make up 70% of previous wrongful conviction exonerees. (Smith 2010). In this amicus curae brief I intend to argue that police used psychologically coercive tactics to gain Jalonte Little’s confession.

Information about the Author(s):
Psychology major social work minor from southern california. Interested in a career in law enforcement following graduation

Faculty Sponsor: amanda zelechoski

Student Contact: Chanice Youell chanice.youell@gmail.com
How Pretrial Publicity Can Destroy A Case

Sarah Harrington

Departmental Affiliation: Psychology
College of Arts and Sciences

Project Code: PSY-8

I will be arguing that the amount of pretrial publicity before the case against Casey Anthony changed the way the case was perceived, and processed. Because of all the pretrial publicity, the case was a huge part of social media coverage and therefore almost everyone in the area knew details, making it harder to choose a jury. It was compared to the OJ Simpson case because the verdict was so controversial. Had the case been a lower profile case publicly, there may have been less controversy surrounding the verdict. People speculate whether or not the verdict was correct, but I feel like they only do this because it was such a high profile case. I am arguing that if there had not been such a great amount of publicity surrounding the case before it went to court, the verdict may have been different, it may have been less controversial either way, and it may have been processed differently.

Information about the Author(s):
I am a junior Psychology major at Valparaiso University. I switched to Psychology during my sophomore year because I had always been interested in criminal psychology. Originally I wanted to work with criminals in prisons and that is how I decided to switch to Psychology. This case has always interested me, because it was compared to the OJ Simpson case, another fascinating and controversial case dealing with this topic.

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Child Abuse/Child Witness

Jasmine Scott

Departmental Affiliation: Psychology
College of Arts and Sciences

Project Code: PSY-9

In this recent case that has been taking over the media, a young four-year-old girl was killed at the hands of her mother and her mother's boyfriend. After an emergency custody battle with the father and a number of other witnesses including the child, the father was denied rights and later the child was found unresponsive with blunt force trauma and malnutrition. In this project, we will conduct an amicus brief to show the effects of child services actions on father's rights and child witness.

Information about the Author(s):
This story is significant and relevant to my field of choice in my future career as well as related to class topics that have been recently discussed.

Faculty Sponsor: Amanda Zelechoski

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It Falls to Us: Linking The Waste Land to Dante’s Divine Comedy

Katherine Balkema

Departmental Affiliation: Christ College

Project Code: THEO-1

Be it as a completed work or as individual sections, the ambiguity of T.S. Eliot’s most famous poem has always been the subject of scholarly debate. Though concrete conclusions are seldom reached in any of these discussions, the mere exchange of readers’ ideas is often the most rewarding aspect of the dialogue surrounding the poem. The presented paper attempts to join that conversation through an analysis of the fifth section of The Waste Land and how it may be related to Dante Alighieri’s Divine Comedy. Through the interpretation of a number of allusions, I propose that there is a journey of sorts depicted in the final section of The Waste Land, and that this journey is rather similar to that seen in the first two thirds of Dante’s epic voyage through the afterlife. In exploring such a connection, new lines of interdisciplinary thought may be inspired in other members of the community, be it in a theological, philosophical, or perhaps even psychological sense. If nothing else, however, the proposed subject matter will draw attention to a potential narrative within the organized chaos of The Waste Land.

Information about the Author(s):
Katherine Balkema is a senior Psychology major with minors in social work and the humanities. As part of her humanities minor, she studied both the Divine Comedy and the poetry of T.S. Eliot in separate seminars. Given that the Eliot seminar was the last course needed to complete her minor, she took the opportunity to connect what she had learned over her coursework in one final project. This is her first academic presentation.

Faculty Sponsor: Edward Upton

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Effective Sincerity: On Catholic Private Prayer and the Poetry of Mary Karr

Emily Neuharth

Departmental Affiliation: This paper was written for a Christ College research seminar "On Poetry and Prayer: How (Not) To Speak of God"

Departmental Affiliation: Christ College

Project Code: THEO-2

This paper questions the assumed theological and literary division between seventeenth century poet Ben Jonson and contemporary poet Mary Karr. Jonson’s poetry depicts a Catholic relationship with God as traditionally uncomplicated and therefore unrealistic, where Karr’s poetry is theologically atypical and might even be considered obscene. This paper argues that Karr’s poetry is similar to Jonson’s in that they are both influenced by the traditional elements of private prayer: confession, invocation and thanksgiving. Despite these shared elements, the poets diverge when evaluating the effectiveness of their interpretations of Catholic prayer form. This paper explores where prayer and poetry overlap through “effective sincerity,” as both are most effective when they are most sincere. It argues that Karr in going beyond Jonson’s prayer-influenced poetry by adding her own personal experiences and raw emotions – e.g., anger at God, at life and at herself – produces more relatable, more sincere work than that of traditional poetry. Her sincere work humanizes Catholicism to the point of wide understanding, and so is more effective in both poetry and prayer at creating accessible platforms for all readers to reach for God’s forgiveness and love. In making this argument, this paper suggests ways to approach the notions of “effectiveness” and “sincerity” when analyzing intimate, subjective language like that of prayer and poetry.

Information about the Author(s):
I am a sophomore Creative Writing major with Christ College Scholar honors. I am Editor in Chief of our literary magazine The Lighter. I am passionate about the powers of creative expression, and have loved the opportunity to showcase said powers in a "objective, concrete" way that is more persuasive to people who might underestimate literary and artistic scholarship. My poetry has appeared in The Lighter and Tributaries. I'm an empath, artivist, alien-believer, and metaphor-junkie.

Faculty Sponsor: Chelsea Wagenaar

Student Contact: Emily Neuharth emily.neuharth@valpo.edu
In His Image: A Question of Creation and Humanity's right to Human Dignity.

Taylor Justison

*Departmental Affiliation:* Christ College
*College of Christ College*

*Project Code:* THEO-3

Individuals with cognitive disabilities often fall victim to discrimination, and even violence, due to stigmas and inefficient legal standards. This paper seeks to affirm equal rights for all individuals, grounding this argument in the idea that every person deserves the same human and religious rights, regardless of mental capacities, under the assumption that human dignity is something inherent to all humans since we are all created via *Imago Dei*, or “in the image of God”. The first part of this paper takes on traditional philosophies frequently used to justify the concept of human dignity, such as those of Aristotle and Kant, which value thought but do not adequately affirm the dignity or protect the rights of those whose reasoning is impaired. The theological concept of *Imago Dei* disregards differences in mental capacities, providing stronger justification for equivalent human dignity, and therefore, more adequately protects human rights. The second part of this paper uncovers the inexcusable amount of discrimination disabled persons suffer within communities committed to *Imago Dei*, like within the Christian Church. This indicates that commitment to the theology isn’t in itself enough. I suggest that here we discover the importance of religious ritual and total inclusion in the forming of religious community and protection of rights. The discrimination in society and exclusion from the community of believers in the Christian church takes away this inherent dignity. The responsibility rests with reasoning individuals to affirm the deserved dignity of those who lack the ability to affirm it for themselves.

*Information about the Author(s):*
Growing up with a neighbor with Down Syndrome, I learn at an early age that one’s capacity to learn has no correlation on one’s capacity to engage in meaningful relationships or a purposeful life. As our friendship grew, I also witnessed the discrimination and bullying that she faced because of her differences. In my paper, I plan to explain that those with mental handicaps uphold the same levels of human dignity as any other human.

*Faculty Sponsor:* Professor Jakelić

*Student Contact:* Taylor Justison taylor.justison@valpo.edu
Examining the Factors in Creating a Strong Student Personal Brand: Comparisons of Importance versus Expectations

The main objective of this study is to examine students’ perceptions of the factors important creating a strong student brand as well as evaluations of their performance on these factors. The specific objectives of the study are to: a) examine importance and evaluation of these factors for creating a strong student brand; and b) compare the importance and evaluations of these factors, as well as examine these factors by student demographics. Based on literature reviews, personal interviews and focus groups, the study identified nine factors to measure student’s personal brands, which are academic performance, internships, work experience, attitude/moral standards, study abroad, cultural awareness, campus involvement an extroverted personality, and community service. These factors are measured on a 5-point importance and agreement scale. The survey based on 181 student responses revealed that attitude/moral standards were perceived as the most important for becoming a strong student brand. Concerning evaluations of their performance, students believe that attitude/moral standards are strongest for their personal brand. The comparisons of expectations versus evaluations of these nine factors found a significant relationship between perceptions of importance vs. evaluation for academic performance and internships. Comparing T-tests for male vs. female perceptions of community service and cultural awareness found that females perceive both factors as more important than males. There is also a significant difference in male and female perception of attitude, study abroad experience, and campus involvement. A statistically significant difference was found between the importance and expectations of cultural awareness among class levels. The results also show there was a significant difference among class levels. The results also showed there was a significant difference among class levels for community service, academic performance, attitude, and cultural awareness. The results provided important insight for students seeking a strong personal brand after graduation.

Information about the Author(s): Sihao Zhou, Matthew Pieroth, and Lauren Tehan are senior Marketing students. The topic of student branding was presented in a marketing research class they took together. They saw potential for this topic to provide a road map for students post-graduation.

Faculty Sponsor: Musa Pinar

Student Contact: Matthew Pieroth lauren.tehan@valpo.edu
Analysis of Valpo Women's Soccer Heart Rate Data

Grace Rogers, Pall Baggett, Montel Hall

Departmental Affiliation: Information and Decision Science
College of Business Administration

Project Code: CS-1

Prompted by the head coach, we would like to help our NCAA Division One Women's Soccer Team use the data gathered from their heart rate monitors. We want to know how types of information recorded correlate with each other to aid in developing optimal rest and recovery. The questions we wish to answer include: "What variables contribute to trimp score?", "Is QRT score predictive of performance?", and "Are previous training sessions predictive of performance?" Data are provided by head coach Marovich and span several years. As technology improved over the years, the data collected became more complex, so only data from the fall season of 2017 was retained to ensure completeness of records for all variables of interest. The cleaned dataset contained 3629 instances and 43 variables, and analysis was conducted in Excel and R. From analysis it was found that there is a strong positive correlation between average heart rate and trimp score ($r = .9744$), total calories burned and trimp score ($r = .9510$), and total minutes played and trimp score ($r = .8372$). These results are fairly intuitive; A higher average heart rate, as well as the other independent variables, imply strenuous activity, so the workload would also be higher. Further results show it was difficult to predict game outcome and performance from previous training sessions and QRT scores. From this data, we recommend that coaches focus mainly on average heart rate when determining workload to maximize player performance throughout the season.

Keywords: soccer, modeling, trimp score, QRT, heart rate, training effect, heart rate monitors

Information about the Author(s):
Grace Rogers: Member and captain of the Valpo women's soccer team. Majors in actuarial science and business analytics.

Faculty Sponsor: Sanjeev Jha

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Evaluation of Travel Time Reliability on Lincolnway

Lauren Zeeb, Jay Grossman

Departmental Affiliation: Civil Engineering
College of Engineering

Project Code: CE-1

Travel time reliability is an important metric of traffic signal system operations and an important consideration of the user experience. A number of different methods have traditionally been employed to track the time a vehicle takes to pass through a corridor. This study compares several different measures to track travel time through the Lincolnway corridor in Valparaiso Indiana, including Bluetooth MAC address collection, GPS logging application, commercial traffic study software, and pilot car techniques. The travel time on Lincolnway is of special interest this year due to the City of Valparaiso's recently completed traffic signal retiming project. Travel time information collected as part of this research was compared to data collected before the retiming project. The effectiveness of various travel time data collection techniques is presented as well as an evaluation of the change in travel time due to the retiming project.

Information about the Author(s):
Lauren Zeeb is a junior civil engineering major who is interested in the transportation profession. Lauren contacted Professor Jay Grossman about a possibility to do research with him. Professor Grossman suggested travel time reliability as that was something he had experience with and would be a good first research project and she was very interested in the topic.

Faculty Sponsor: Jay Grossman

Student Contact: Lauren Zeeb lauren.zeeb@valpo.edu
Solar Thermal Decoupled Process: The Rotating Disc Electrode's Effect on Mass Transfer of Cobalt Oxide

Rachel Silcox, Guadalupe Villagran

Departmental Affiliation: Mechanical Engineering and Chemistry
College of Engineering

Project Code: ME/CH-1

In order to make the production of H\(_2\) (a fuel) from H\(_2\)O in a decoupled solar thermal-electrolysis process commercially viable, current densities of at least 50 mA/cm\(^2\) during electrolysis are required. When the cobalt oxide electrolyte is quiescent in our electrolysis cell, current densities are far below this value. One approach to increasing the current density is to mechanically increase fluid motion (convection) to enhance mass transfer to the electrode surface. To assess the impact of convection on mass transfer and to better understand the kinetics involved in the process, we employed a rotating disc electrode. Our results show that the current density increases, as expected from the Levitch equation. However, it has proven challenging to quantify the increase and to model the kinetics due to difficulties in repeatability of the experiment. In this poster we describe our current findings with convective mass transfer and relate them to our previously developed model for the electrochemical kinetics under quiescent conditions. Extending our model to convective mass transfer will allow the model to be more effectively used to develop and evaluate commercial cell designs that could be implemented for the efficient production of H\(_2\) from H\(_2\)O, a sustainable solar fuel.

Information about the Author(s):

Faculty Sponsor: Jon Schoer; Luke Venstrom

Student Contact: Rachel Silcox rachel.silcox@valpo.edu
The Sensitivity of Predicted Solar Thermal Reactor Performance to Solid-state Kinetics

Amanda Jaacks, Luke Venstrom

*Departmental Affiliation:* Mechanical Engineering  
*College of Engineering*

*Project Code:* ME-1

A solar thermal rotary kiln reactor designed to continuously decompose Co3O4 to CoO was analyzed numerically using the finite-volume technique. The reactor model calculates the reactor temperature, the extent to which Co3O4 is converted to CoO, and the efficiency with which concentrated solar energy is used to drive the reaction as a function of the feed rate of Co3O4 and the solar power. In this study, we analyzed the sensitivity of the reactor model to the solid state kinetic model selected for the decomposition reaction. Two competing solid state kinetic models from the literature were considered. The first, called the shrinking core model, was developed at Valparaiso University and the second, the Avrami-Erofeyev model, was developed at the Georgia Institute of Technology. The results show that the reactor model is extremely sensitive to the kinetic model selected. For example, at a Co3O4 feed rate of 90 g/min and a solar power level of 4000 W, the reactor model predicts that 100% of the Co3O4 is converted to CoO at an efficiency of 30.0% when the shrinking core model is selected for the reaction kinetics and that none of the Co3O4 is converted to CoO when the Avami-Erofeyev model is selected. Given the sensitivity of the predicted reactor performance to the reaction kinetic model, future research is needed to determine why the available kinetic models are different and on developing a more robust model suitable for use in reactor modeling efforts.

*Information about the Author(s):*  
Luke Venstrom is a professor of mechanical engineering at Valparaiso University. Amanda Jaacks is a senior mechanical engineering student at Valparaiso University with a minor in physics. This project is of interest to both Luke and Amanda, as they are both passionate about designing for a more sustainable future through renewable energies.

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Quantifying Physiological Inadequacies in Sensory Resolution

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Departmental Affiliation: Department of Mechanical Engineering and Bioengineering
College of Engineering

Project Code: ME-2

Electrodermal activity (EDA) and electrocardiograms (ECG) have been shown to be strong indicators of physiological stress responses [1]. However, we do not know if these biosensors can also be used to quantify physiological inadequacies of sensory feedback. Sensory feedback describes all information an individual obtains through interaction with their environment and use to make cognitive decisions about their surrounding. If this sensory information is inconsistent or inadequate, an individual will be unable to accurately assess their surroundings. If we can measure deficiencies in sensory data from physiological responses, this knowledge will be helpful in designing sensory feedback systems for human-machine interfaces, such as prostheses.

To determine if sensory inadequacies can be measured by EDA and ECG sensors, we developed an interface that allows us to manipulate the resolution of sensory feedback that a subject receives while completing a virtual maze with two degrees of directional freedom. The interface allows us to vary two types of sensory feedback: the visibility of the cursor and the tactile feedback that a user receives while moving in the virtual environment. We will then measure how the subject’s physiological stress response correlates with the changes in sensory feedback. We hypothesize that significant deficiencies or excess in sensory information will result in increased magnitudes of physiological stress, whereas adequate sensory information will minimize stress. We should be able to measure these variances in a subject’s stress state using EDA and ECG biosensors.


Information about the Author(s):
Robert, James, Mitchell, and Isaac are all students at Valparaiso University studying mechanical and biomedical engineering. Robert and James are both seniors, local to Schererville, Indiana and Naperville, Illinois. Mitchell and Isaac are juniors, local to Belleville, Wisconsin and Three Oaks, Michigan, respectively. All four have been actively conducting research in the College of Engineering’s Human-Machine Interfaces (HMI) laboratory. Their research collectively looks at the interplay between human beings and biological technology.

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Synthesize of Polymer Colloidal Crystal

Maisie Su

Departmental Affiliation: Mechanical Engineering
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Project Code: ME-3

Colloidal crystals are highly ordered materials that possess a periodically dielectric constant. Due to their unique optical properties, colloidal crystals have potential applications in photonic crystals, biosensors, templates and tissue engineering. In this study, the “bottom-up” self-assembly method was developed to assemble the PSs nanoparticles into a 3-dimensional (3D) arrays. Monodispersed polystyrene spheres (PSs) suspensions (2.5 wt% in water, surfactant free) with spheres diameters of 250 nm were purchased from Alfa Aesar company (standard deviation of the diameter of PSs is less than 5%). The assembly uses the capillary forces at the meniscus of a colloidal suspensions to draw colloids into face con centered cubic (FCC) close-packed arrays. In this approach, the PS nano particle suspensions were diluted by adding water purified by a Milli-Q system. As substrates we used hydrophilic microscope glass. 90 ml spheres suspensions were displaced into a cell. In order to precisely control the temperature and humidity of film growth, the cell then was put into an incubator. As the solvent evaporates, the water flow convention brings the nano particles into the center of the substrate, coating it with spheres that can be assembled into highly crystalline arrangement. The 3D structures of polystyrene colloidal crystals were examined by using scanning electron microscopy (SEM). We also investigated the humidity and temperature effects on the formation of the polystyrene colloidal crystals.

Information about the Author(s):
I am an international student. I studied in Dalian Jiaotong University for two years and another two years in Valparaiso university. My major is mechanical engineering. I would like to do some research for challenge.

Faculty Sponsor: Di Zhang

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A Qualitative Study: Undergraduate Students’ Attitudes and Beliefs about Marijuana

Bradley Adkins, Ellie Ashbrook, Andrea Pertl, Madissen Brookshire-Green, Guadalupe Ortiz, Olivia Smith, Emma Kamp, Kayleigh Willett

Departmental Affiliation: Nursing
College of Nursing

Project Code: NURS-1

Young adults often initiate marijuana use during college (Suerken et al., 2014) which has resulted in marijuana being reported as the most prevalent illicit drug used on college campuses (Johnston et al., 2012). Students are in favor of legalizing marijuana for medical and recreational use in adults and believe using marijuana is safer than alcohol (Pearson et al., 2016). The aim of this study was to assess attitudes and beliefs about marijuana among undergraduate students at a faith-based, Mid-western university. Fitting with social learning theory, beliefs and attitudes towards drug use are derived from a variety of sources including social norms and perceived effects (Bandura, 1986). Undergraduate students during the 2016-2017 academic year were recruited through courses and campus posters. Data were collected using structured, open-ended questions regarding students’ attitudes and beliefs about marijuana. Four focus groups were recorded, transcribed verbatim, and analyzed for trends and categories. Thirty-seven students participated (18-36 years, \( M = 19.9 \)). Each group included 6-12 students. The majority were white (76%), female (59%), and non-Greek affiliated (70%). Nineteen percent reported using marijuana within the last 30 days. Five descriptive categories were identified: media exposure, attitudes toward use, perceived societal benefits, reasons for usage, and legalization and regulation. Students reported increased exposure to marijuana-related content in various media sources. Students believed societal attitudes about marijuana use are becoming more relaxed, and they are accepting of its use for both medicinal and recreational purposes.

Information about the Author(s):
Bradley Adkins, Ellie Ashbrook, Andrea Pertl: Senior Nursing Students
Madissen Brookshire-Green, Guadalupe Ortiz, Olivia Smith: Junior Nursing Students
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The Link Between Antihypertensive Agents and Cognitive Decline

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Departmental Affiliation: Health Sciences/Physician Assistant Studies
College of Nursing

Project Code: NURS-3

By the year 2020, 42 million individuals are expected to suffer from dementia. A curative treatment for the disease has not yet been developed which stresses the importance of managing modifiable risk factors. Given that dementia has been linked to hypertension in elderly patients, a plethora of research has examined the relationship between antihypertensive agents and cognitive decline (Andrieu et al., 2015). The purpose of this project was to provide an answer for the following focused clinical question: in elderly patients with hypertension, how does the use of antihypertensive agents influence cognitive decline and the onset of dementia? A search for literature was conducted with the use of five databases (Cochrane Library, National Guideline Clearinghouse, PubMed, MEDLINE, and CINAHL). The search yielded one systematic review, two meta-analyses, one integrated review, one randomized control trial, one cohort study, and one review article. Findings that work to answer the focused clinical question will be presented.

Information about the Author(s):
Kayleigh Corn, Alyson Kinzie, and Luke Stanczyk are members of the physician assistant program. They are in their third year of the program and are anticipating graduating this May with an undergraduate degree in Health Sciences before moving on to the graduate phase of the program.

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Cardiovascular Disease: Analyzing Primary and Secondary Prevention Strategies

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Departmental Affiliation: Health Sciences Physician Assistant Program
College of Other

Project Code: NURS-2

Cardiovascular disease (CVD) is the single most common cause of death around the world, with an increasing number of people living with coronary heart disease (CHD) (Anderson et al., 2016). Smoking and tobacco use are major risk factors for CVD and are the leading preventable causes of death globally. The chance of developing CVD is reversible and the elimination of tobacco use after a heart attack can reduce an individual's risk of CVD mortality by 36% over two years (Rigotti & Clari, 2013). Smoking cessation is the central element of primary and secondary prevention strategies. Primary interventions can include aspirin and statin therapy, while secondary preventions include, but are not limited to, exercise-based rehabilitation and psychosocial interventions. The purpose of this project is to determine whether primary or secondary interventions are more effective in reducing the risk of developing CVD. To answer the clinical question, a thorough review of the literature was organized in the databases, Cochrane Library, National Guideline Clearinghouse, CINAHL, and PubMed Clinical Queries. The search yielded relevant sources of evidence which met the inclusion and exclusion criteria. Evidence included systematic reviews and randomized control trials. The findings regarding the best interventions to reduce the risk of cardiovascular disease will be presented. These findings will assist healthcare providers in implementing the best quality of care to their patients.

Information about the Author(s):
Dwight Moline, Audrey Corn, Michael Bohney, and myself, Anastacia Mesina are all third year students in the Physician's Assistant Program. We will all graduate in May and begin our graduate program in August 2018. We selected Cardiovascular Disease specifically looking at primary and secondary prevention strategies. We chose this topic because CVD is an ongoing issue within the medical field where awareness and education must be addressed. We hope to further the knowledge and insight of our fellow classmates on the topic of CVD.

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